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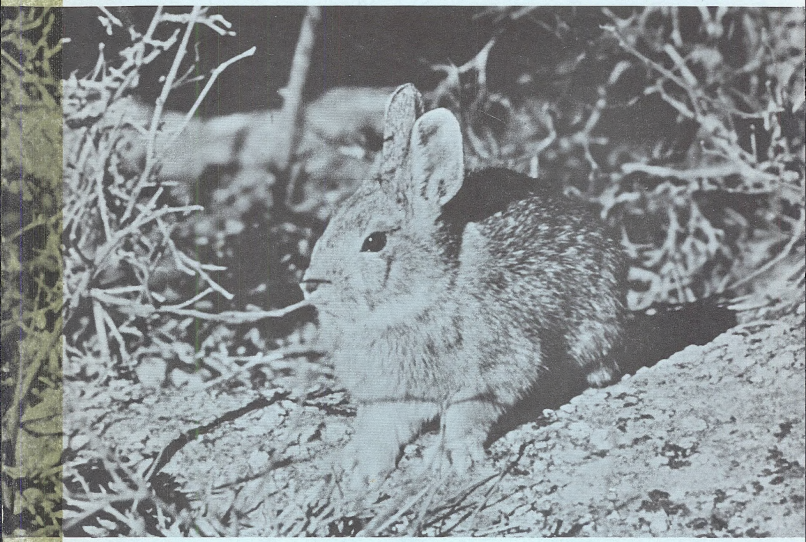
VIBAUX-BEACH WILDLIFE BASELINE STUDY - NONGAME SPECIES



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ABSTRACT

A non-game wildlife inventory was conducted by the Bureau of Land Management from September 1977, to December 1978 on a 258 square mile tract in Wibaux County, Montana and Golden Valley County, North Dakota. This area, known as the Wibaux-Beach Known Recoverable Coal Resource Area (KRCRA), was nominated for possible leasing of federal coal in 1976 by several companies so a complete wildlife inventory was essential before any leasing recommendations could be made regarding this area. In addition to this non-game study, Munson (1979) completed a game species inventory.

Four major wildlife habitats were delineated on the study area. Small-grain fields covered 95,880 acres (58 percent); upland grassland covered 62,320 acres (38 percent); and creek bottom and grassland coulee both comprised two percent of the study area, covering 3,740 and 3,170 acres, respectively. Although creek bottom habitat comprised only two percent of the study area, it was the most important habitat for the wildlife species.

Data were collected on the occurrence, relative abundance, distribution, and habitat relationships for six species of amphibians, eight species of reptiles, 149 species of birds, and 35 species of mammals. Two roadside survey routes, each 70 stops in length, were established for data collection on vertebrate species. Incidental observations of wildlife species were also recorded while tranversing the area. Approximately 7,000 direct observations of wildlife species were made.

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Horned larks and house sparrows and western meadowlarks were the dominant yearlong residents and summer residents, respectively. Small mammal communities were sampled in ten vegetative types which formed the four major wildlife habitats for the spring, summer, and fall seasons. A total of 9,806 trap nights yielded 840 captures of small mammals/other vertebrate species. Peromyscus spp. was the dominant small mammal in virtually all vegetative types. Particularly noteworthy, was the capture of 12 meadow jumping mice. This species is a "special interest or concern" species for the state of Montana. Only two previous studies captured this species in Montana.

ACKNOWLEDGEMENTS

This study was funded by the U.S. Bureau of Land Management (BLM) and conducted by BLM personnel from the Miles City District Office in Miles City, Montana. We would like to express our gratitude to the many people who assisted us with this study. Many landowners not only allowed acccess to their land, but also provided valuable information about wildlife on the study area. Several landowners and their families collected representative wildlife specimens, saving us many hours of field work. Doctors R.L. Eng, R.E. Moore, and Mr. Ray Hays provided advice on sampling the small mammal and bird populations. In addition, they verified the identification of many specimens, prepared the study skins, and stored these voucher specimens in the Montana State Unversity Zoological Museum. Doctors R.S. Hoffman and P. Wright also identified many Peromyscus and Zapus specimens to species.

The Montana and North Dakota Fish and Game Departments were very helpful in providing information and/or assistance. Jon Swenson and Dennis Flath from the Montana Fish, Game, and Parks Department and Stan Kohn and Steve Allen from the North Dakota Fish and Game Department were especially helpful. Finally,we would like to thank the many people of the Bureau of Land Management who provided their assistance and expertise for the completion of this study.

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INTRODUCTION

Background

The Bureau of Land Management (BLM) is mandated with the responsibility of managing the surface and/or subsurface resource values (i.e., range, wildlife, watershed, soil, minerals, etc.) on public lands. As the mineral leasing arm of the federal government, BLM is responsible for protection and reclamation of surface resources on privately owned lands overlying federal mineral developments.

Large lignite and sub-bituminous coal fields underlie much of the surface of eastern Montana and western North Dakota. Although most of the surface land is privately owned, a large portion of the mineral acreage is owned by the Federal government. Some of the coal reserves have been tentatively mapped, evaluated, and designated as Known Recoverable Coal Resource Areas (KRCRA's). One such designated coal reserve in this region is the Wibaux-Beach KRCRA. In 1976, several large coal development interests nominated tracts of federal coal within the Wibaux-Beach KRCRA for possible leasing.

The Wibaux-Beach KRCRA encompasses approximately 124,048 surface acres and the federal government owns roughly 33.5 percent of the subsurface coal mineral estate. All of the surface land and the remaining subsurface estate is either privately owned or owned by the States of Montana or North Dakota.

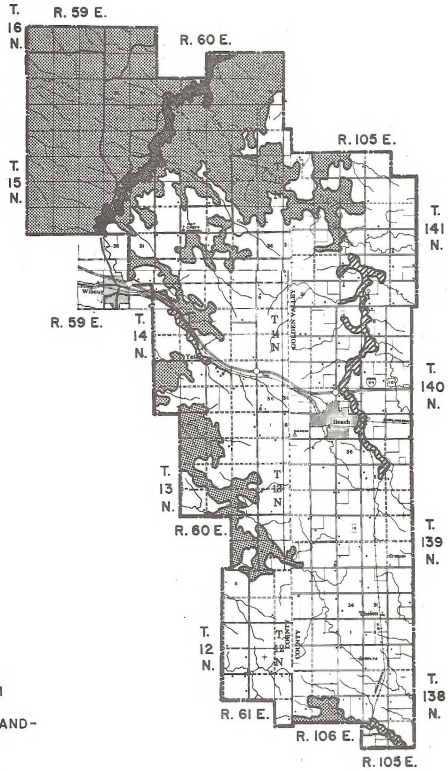
Since the surface lands are all privately owned, BLM had not developed any information on the surface resource values. As a result of the lack of wildlife population and habitat information, a wildlife inventory was absolutely essential before any well-founded, responsible decisions could be made regarding leasing of federal coal in the Wibaux-Beach KRCRA.

Because of the possible leasing interests, and the relative lack of wildlife information within the area, BLM initiated an intensive wildlife inventory on a 258 square mile study tract within the Wibaux-Beach KRCRA (Figure 1). One phase of the inventory was a study of the game species -- mule deer, whitetailed deer, antelope, game birds, raptors, and waterfowl, plus some additional species. The other portion of the inventory was concerned with the non-game species (i.e., amphibians, reptiles, non-game birds, and non-game mammals). Although this report is primarily concerned with the non-game species, some data on game species is included to give some insight into the overall wildlife community and structure within the Wibaux-Beach study area.

The inventory objectives were as follows:

1. Identify and document the occurrence and distribution of the non-game vertebrate wildlife species on the study area.

2. Identify and document seasonal use areas, crucial areas, endangered species habitat, special areas, migration routes, and introduction/



LEGEND

- CREEK BOTTOM
- GRASSLAND-SHRUB
- GRASS COULEE
- SMALL GRAIN

WIBAUX-BEACH WILDLIFE STUDY AREA AND HABITAT TYPES

FIGURE 1

reintroduction areas for the non-game vertebrate wildlife species within the study area.

3. Identify and record any significant habitat problems, limiting factors, habitat conflicts, and the existing habitat status of non-game wildlife species on the study area.

4. Identify and document any potentially suitable, but presently un-occupied, habitat for the non-game wildlife species of the study area.

Definitions of the aforementioned and pertinent habitat components follow BLM Manual 6610 and are included in Appendix A.

The non-game phase of the Wibaux-Beach wildlife inventory was originally set up as a two-year study. Data collection commenced in September, 1977; however, the field work was terminated in December, 1978, after it was determined that sufficient data was collected to fulfill the non-game study objectives.

Description of Study Area

The Wibaux-Beach wildlife inventory study area is a 258 square mile tract of land located in Townships 11N - 16N, and Ranges 59E - 61E, of Montana, and Townships 138N - 142N, and Ranges 106W - 105W of North

Dakota. The study area is located within the Great Plains - Shortgrass Prairie Province -Wheatgrass - Needlegrass Section as decribed by Bailey (1978).

Four major wildlife habitats were delineated for purposes of this study (Figure 1). The dominant habitat was small grain fields which covered 95,880 acres, or 58 percent, of the total study area. The primary cultivated crops were various kinds of wheat (Triticum spp.), oats (Avena sativa), sunflower (Helianthus annuus), safflower (Carthamus tinctorium), and alfalfa (Medicago sativa). Windrows and shelterbelts were found in some of these grain fields, particularly in the southern portion of the study area.

Upland grassland habitat comprised 62,320 acres or 38 percent of the study area. Common grasses were blue grama (Bouteloua gracilis), green needlegrass (Stipa viridula), western wheatgrass (Agropyron smithii), and little bluestem (Andropogon scoparius); while, fringed sagewort (Artemisia frigida) and sweetclover (Melilotus spp.) were common forbs. Woody draws were scattered throughout the grasslands. The common woody trees/shrubs were green ash (Fraxinus pennsylvanica), box elder (Acer negundo), chokecherry (Prunus virginiana), rose (Rosa spp.), snowberry (Symphoricarpos occidentalis), and buffaloberry (Sheperdia argentia).

Creek bottom habitat comprised 3,740 acres, or 2 percent, of the study area. Beaver Creek enters the study area one mile north of Wibaux,

continues through the northern boundary of the study area, and eventually empties into the Little Missouri River in North Dakota. The creek bottom habitat included an interspersion of several types of vegetative communities. Willows (Salix spp.) and rose bordered the creek. Green ash, box elder, and plains cottonwood (Populus sargentii) with an understory of buffaloberry, chokecherry, snowberry and wild plum (Prunus americana) formed a broadleaf-open canopy community adjacent to the creek in some places. The bottomland was also utilized for hayfields and small grain fields. Many grassland-coulees drained into Beaver Creek. The common grass species were smooth brome (Bromus inermis) and bluegrass (Poa spp.). There was a gradual vegetative transition of grassland-coulees to mesic shrub communities of rose, hawthorn (Crataegus spp.), and buffaloberry, and an eventual transition to woody draws of chokecherry, wild plum, buffaloberry, snowberry, and green ash. These communities and various transitional stages of this succession were found in the creek bottom habitat. In addition, two small xeric shrub communities of dwarf sagebrush (Artemisia cana) were found along the creek.

The grassland-coulee habitat made up 3,170 acres, or 2 percent, of the study area. The majority of this habitat was found north of Beach, North Dakota, along Little Beaver Creek. The grassland-coulees eventually drain into Little Beaver Creek which empties into Odland's Reservoir. The common grasses/forbs occurring in the grassland-coulee habitat were smooth brome, bluegrass, and cattail (Typha latifolia).

Climate

The Wibaux-Beach climate is best described as continental, i.e., cold winters, warm summers, and marked variation in seasonal precipitation (U.S.D.A. Weather Bureau, 1937). Winter snowfall averages 25.4 inches per year; however, the average annual precipitation is only 13.73 inches (U.S. DEPT. of Commerce, 1977). The most precipitation normally occurs in June.

January is the coldest month with an average temperature of 11.6°F and July is the warmest month with an average temperature of 68.9°F (U.S. Dept. of Commerce, 1960 and 1966).

There was considerable variation in the climatic factors for the study period. Wibaux received 18.45 inches of precipitation from September, 1977, to August, 1978 (U.S. Dept. of Commerce, 1977). This was +4.72 inches of precipitation above normal. In addition, the average temperatures for January and February were a -10.6°F departure from the normal with average temperatures of 1.0°F and 7.4°F, respectively (U.S. Dept. of Commerce, 1977).

Physiography and Soils

For the most part, the Wibaux-Beach study area consists of gently rolling prairie lands and farmlands. Approximately one-third of the study area in the northwest is native rolling grassland interspersed with woody

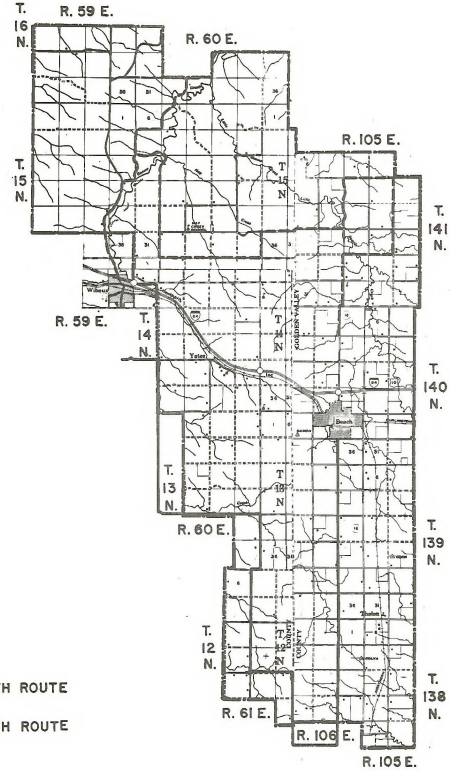
draws, small grain fields, and creek bottom. The other two-thirds of the study area are primarily farmland with some scoria buttes in the southern portion of the area. Most of the area is relatively flat at 2900-3000 feet altitude.

The soils of Wibaux County were described by McConnell, et. al. (1958). Soils found within the study area are shown and summarized in Appendix B.

MATERIALS AND METHODS

Wildlife Census Techinques

Several different techniques were utilized to inventory non-game vertebrate species on the study area. Vehicle routes were established and the majority of the data was collected by the roadside survey technique. The particular routes and stops were selected by their roadside habitats and accessibility during the winter months. One route was in the northern portion of the study area; while, the other route was in the southern portion. (Figure 2). Each route was 70 stops in length with the stops spaced approximately one-half mile apart. This technique was patterned after Robbins and Van Velzen's (1967) Breeding Bird Survey, but deviations from the original technique were made to satisfy data collection purposes of this study. Each route was run once a month from December, 1977, to December, 1978. Data was also collected on all non-game or game vertebrate species that were seen or heard along the prescribed route, e.g., if a mule deer or garter snake crossed the road between stops, it was recorded as occurring at the closest stop. All observations were recorded by species, number observed, sex (if known), habitat type, and location. In addition, there were several seasonal deviations made. For example, the listening period for birds was abandoned during the winter (December-February) after it proved to be practically useless, especially when the wind was blowing. Also, the routes were split in half during the summer (June-August) because the large amount of data collected per route prohibited completion of the route in the prescribed time period. These deviations from the Breeding Bird Survey technique were not

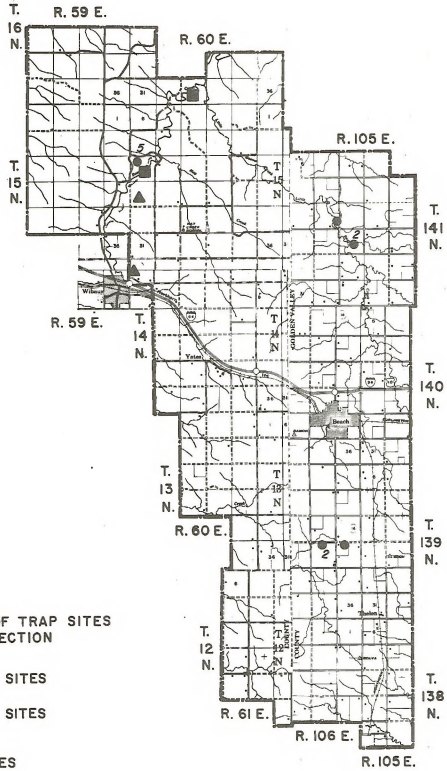


ROADSIDE SURVEY ROUTES

FIGURE 2

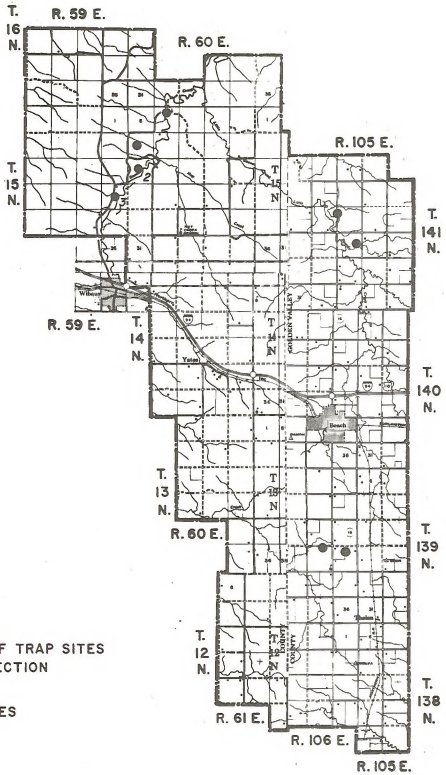
believed to have biased the results as the technique was utilized as a systematic method of data collection rather than an actual Breeding Bird Survey.

Small mammals were censused by the following techniques. Traplines were set seasonally within each of the ten vegetative types which formed the four major wildlife habitats. Although it was desirable to change the specific study site of each vegetative type each trapping season, this was not possible for some of the vegetative types because of limited acreages of the specific vegetative type and/or access to that vegetative type. Study sites that were trapped are shown in Figures 3, 4, and 5. Traplines consisted of 25 stations approximately 10 yards apart with four traps per station. Each station consisted of a Sherman live-trap and a combination of rat and museum special snap traps. A rat trap, a Sherman live-trap, and two museum special snap traps were used at every third station (i.e., station numbers 1-4-7-10, etc.), and a Sherman live-trap and three museum-special snap traps were used at all other stations. Therefore, each trapline consisted of 25 Sherman live-traps, 9 rat traps, and 66 museum-special snap traps. Peanut butter and oatmeal was used as bait for the traps. Traplines were set and checked daily for three successive nights in each vegetative type. This was done for the spring, summer, and fall seasons. The winter season was excluded because of the heavy snowfall accumulation during the past winter and the possibility of losing the traps. Several habitats were trapped slightly different from the above-described technique during the fall trap period of 1977. This was done primarily because some of the traps were not yet available and to determine the extent of trapping



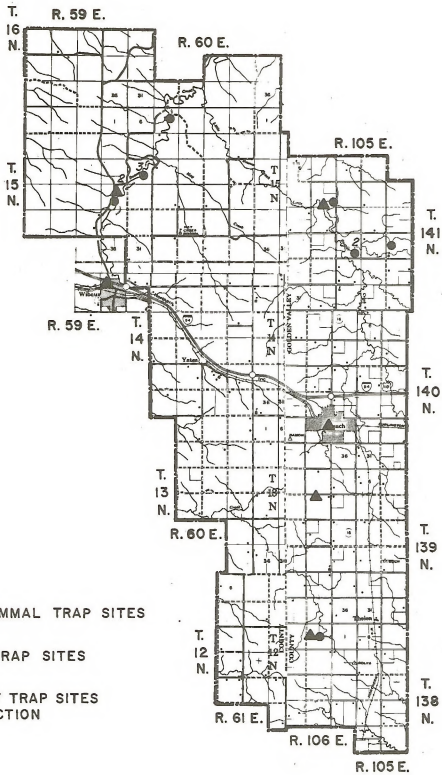
FALL SMALL MAMMAL TRAP SITES

FIGURE 3



SPRING SMALL MAMMAL TRAP SITES

FIGURE 4



SUMMER SMALL MAMMAL TRAP SITES

FIGURE 5

that was necessary to collect an adequate sample of small mammals within the respective vegetative types.

Two lines of pitfall traps were set during the spring and the summer trap periods. Twenty pitfalls were set in the creek bottom habitat and twelve pitfalls were set in the small grain field habitat. This technique was originally intended to be utilized as a technique for collecting shrews, amphibians, and reptiles; however, it was abandoned after both trap periods met with very poor success.

Special trap periods were made to obtain data on specific mammals that were not collected in the traplines; e.g., pocket gophers (*Thomomys talpoides*) were obtained by trapping them with Macabee pincher-type traps. Also, rat traps were set around old homesites and other special areas to obtain data on bushytail wood rats (*Neotoma cinerea*), norway rats (*Rattus norvegicus*), and Ord's Kangaroo rat (*Dipodomys ordi*).

Additional observations were obtained by ground surveys from vehicle and foot. Reservoirs and temporal ponds were visited approximately once per week during the spring and early summer to inventory migratory shorebirds and waterfowl. Several walking line transects were made during the fall and spring to determine whether some of the secretive avian species were excluded from the route data. Incidental observations of unusual or uncommon species were recorded while traversing the study area, and all nesting birds or birds with dependent young encountered were recorded.

In addition, walking ground surveys were made to collect amphibians and reptiles or to collect data on specific mammal or avian species. Several attempts were made to collect bats in riparian habitats and the towns by mist-netting or shooting them with a gun; however, this technique was also abandoned after very poor success. Cottontail rabbits (Sylvilagus spp.) were collected for identification purposes from several habitats by shooting them with a .22 caliber rifle. On several occasions, a spotlight was used to obtain data on nocturnal vertebrate species. While traveling the roads at night, a light was shown across the adjacent areas and all the animals that were seen were recorded. This method was abandoned after a rancher complained.

Data was also obtained from external sources. The Savage 024 Breeding Bird Survey route begins 23.5 miles north of the study area and ends one mile inside the study area boundary. This route was run several times since 1968 so the author ran the route during July 1978 and compared the results. (See Appendix C for a summary of the results for 1968-1978). Also, annual data for furbearers and mammalian predators that are normally taken for fur was obtained from the Montana and North Dakota Fish and Game Departments.

All data, excluding trap data, was computerized and summarized for this report by the BLM computer in Denver, Colarado. All original data and computer printouts are presently on file at the Miles City District Office of the Bureau of Land Management in Miles City, Montana.

Vegetation Classification

Ecological Consulting Service Division (ECON,inc.) provided an infrared aerial photography interpretation of the Wibaux-Beach study area. Seven land unit types (ELU's) were delineated by interpretation and ground truthing. Vegetation and land form characteristics were used to classify the following ELU's: non-irrigated small grain crops, grassland/rolling upland, broadleaf trees-open canopy/coulee, grassland/coulee, xeric shrub-grassland/coulee, mesic shrub complex/coulee, and non-irrigated haylands.

After several months of field work, this classification was modified to a more appropriate classification because there were some discrepancies in the vegetative classification. Some of the vegetative types needed expansion to give a more accurate description of the areas utilized by non-game species. For example, some birds were only found in association with aquatic habitats which are not listed. Also, Munson (1979) utilized a different classification for the game species phase of this study. Therefore, the following technique was utilized to keep both reports consistent.

A habitat classification was devised for the study area. The four habitat types delineated were: creek bottom, grassland-shrub, small grain fields, and grassland coulee. Each habitat includes several different vegetation communities. Table I gives the relationships of habitat types to vegetation communities. It was more functional to utilize habitat types rather than vegetative communities for several

Table I. Cross Reference for Habitat Type and ELU Comparison

Habitat Type	ELU: Small Grains	Windrows	Hayfields	Mesic Shrub	Xeric Shrub	Broadleaf Tree	Upland Grassland	Grassland Coulee
Creek Bottom	X		X	X	X	X		X
Small Grain Fields	X	X						X
Grassland Coulee								X
Upland Grassland	X			X		X	X	X

reasons. Upland grasslands, north of Wibaux, MT., interspersed with woody draws, mesic shrubs and grassland coulees are much more valuable to wildlife than upland grasslands south of Beach, N.D. bordered by 160 acre wheat fields. Also, several of the vegetative communities, e.g. mesic shrubs, woody draws, etc., were often a small clump or patch rather than distinct vegetative communities. Munson (1979) also developed an interspersion index using Baxter and Wolfe's technique (1971). The average interspersion coefficient for each habitat type is shown in Appendix D.

RESULTS AND DISCUSSION

All vertebrate wildlife species are discussed below in their respective sections. The relative abundance of each species was determined by their frequency of capture and/or sightings, plus additional information from local residents and reports and previous studies conducted in adjacent areas.

Amphibians

Six species of amphibians that were found on the study area are listed in Appendix E. According to the distribution maps of Black (1970) and Stebbins (1966), these six species are the only amphibians within the study area boundaries. There were no federally listed threatened or endangered amphibians in this area, but there are some amphibians of "special interest or concern" for the states of Montana and North Dakota. These species of "special interest or concern" are discussed below. The relative abundance of amphibians was determined by their frequency of capture, plus information obtained from local residents.

The tiger salamander (*Ambystoma tigrinum*) was collected on the Beaver Creek/Little Beaver Creek drainages and stockponds. Only twelve specimens were collected; however, it was relatively common within the area. Local residents reported that tiger salamanders frequently used stockponds for breeding purposes and several larvae were captured with a dip net in one pond.

The Plains spadefoot toad (Scaphiopus bombifrons) is an amphibian of "special interest or concern" for the state of North Dakota (McKenna and Seabloom, 1976). Only two spadefoot toads were collected during this study. One was captured by a rancher's son in their yard north of Wibaux, Montana; while, the other specimen was taken in a museum special snap trap in upland grassland north of Beach, North Dakota. One specimen was shown to several of the ranchers and farmers who admitted that they had never seen a spadefoot toad before on the study area. Black (1970) explained that although spadefoot toads are quite common in Eastern Montana, they are seldom seen because of their nocturnal and burrowing activities. Therefore, the spadefoot toad was listed as uncommon based on its limited occurrences and it's "special interest" status in North Dakota.

The Great Plains toad (Bufo cognatus) was collected south of Beach, North Dakota. Ten specimens were collected around a homesite and in a borrow ditch. Although Black (1970) lists the Great Plains toad as occurring in Wibaux County, no specimens were taken there during this study. The Great Plains toad was listed as uncommon; however, it may be locally common at specific sites.

Several specimens of the Rocky Mountain toad (Bufo woodhousei) were collected around homesites and roadsides by local residents and the author. Although no specimens were captured in Golden Valley County, North Dakota, local residents reported that this toad was occasionally

seen around homes and buildings. The Rocky Mountain toad was listed as uncommon based on the few (seven) specimens collected and information obtained from local residents.

Although the Dakota toad (Bufo hemiophrys) does not have a distribution extending into the study area boundaries, it is of "special interest or concern" to the State of Montana (Flath, 1978a). The southern limit of its range in Montana is Roosevelt County (Black, 1970). Since only Richland County (approximately one hundred miles in length) separates Wibaux County and Roosevelt County, this species could possibly occur within Wibaux County.

Only one boreal chorus frog (Pseudacris triseriata) was captured for a specimen; however, numerous chorus frogs were heard around ponds, creeks, etc., while working at night during the spring and early summer. Also, chorus frogs were occasionally found in local resident's root cellars. The chorus frog was listed as uncommon to common for the study area.

The most abundant amphibian on the study area was the leopard frog (Rana pipiens). This frog was found in the Beaver Creek/Little Beaver Creek drainages and stockponds. Approximately 75 frogs were counted one evening while setting a small mammal trapline around the edge of Odland Reservoir.

Several other amphibians were listed as species of "special interest or concern" for the states of Montana and North Dakota. However, the

Plains spadefoot toad and Dakota toad, which were discussed previously, are the only "special interest" amphibians that have distributions within a reasonable distance from the study area to warrant separate discussions. These other amphibians of "special interest or concern" have distributions in western Montana and eastern North Dakota, quite removed from the study area.

Reptiles

Eight species of reptiles were identified as occurring within the study area boundaries. These eight species, plus others deemed noteworthy, are listed in Appendix E. Based on the distribution maps of Black (1970), Davis and Weeks (1963), and Stebbins (1966), ten species of reptiles are known to occur in this area. Although there are no threatened or endangered reptiles listed in the Federal Register for the area, there are several reptiles of "special interest or concern" to the states of Montana and North Dakota. Relative abundance of reptiles known to occur on the study area was determined by their frequency of capture and information obtained from local residents.

The snapping turtle (*Chelydra serpentina*) is of "special interest or concern" to Montana, and is known to occur in Wibaux County (Flath, 1978). According to Flath (pers. comm. 1978b), this classification is based on the snapping turtle's scarcity in this area and possible future adverse environmental impacts, but this status is subject to change if

and when additional data warrants such change. Snapping turtles were observed in Beaver Creek and Odland's Reservoir; however, no specimens were collected during this study because those individuals observed were too large for specimens and its "special interest" status in Montana. Local residents reported that the snapping turtle was relatively common in Beaver Creek and its drainages and they often saw large snapping turtles during late May - early June (breeding season) along unpaved roads and borrow ditches, particularly on the northern end of the study area. The snapping turtle was classified as uncommon-common on the study area for several reasons. To begin with, only three individuals were observed during this study, but Seabloom, et. al., (1978) reported that even though the snapping turtle was abundant in Southwestern North Dakota waters, it was rarely observed. Also, Clancy (pers. comm, 1979) reported that the Montana Department of Fish and Game captured seven or eight large snapping turtles in traps within the Beaver Creek drainage. This and the information obtained from local residents warranted the uncommon-common classification of the snapping turtle.

The painted turtle (*Chrysemys picta*) was observed in practically every body of water on the study area. In addition to the major permanent drainages and impoundments, i.e., Beaver Creek, Little Beaver Creek, Odland's Reservoir, and Old Lodge Reservoir, painted turtles were observed in borrow ditches, temporal pools, and on dry land considerable distances from water. In turn, the painted turtle was classified as common-abundant.

Another turtle of "special interest" to Montana is the spiny softshell turtle (*Trionyx spiniferus*). Like the snapping turtle, the spiny softshell turtle occurs in Wibaux County. No spiny softshell turtles were observed nor did Clancy (pers. comm., 1979) encounter any during a Montana Department of Fish and Game fisheries study of Beaver Creek. As the spiny softshell turtle is very adept at concealment and, oftentimes, only the nostrils are exposed to the surface of the water, it too is rarely observed. Schieffer (pers. comm., 1978) said that a few spiny softshell turtles were in Beaver Creek approximately 15-20 years ago, but whether this species still exists there is questionable.

Although Seabloom, et. al. (1978) observed the sagebrush lizard (*Sceloporus graciosus*) in McKenzie and Slope County, North Dakota, it was only found in the badlands along the Little Missouri River. Since no sagebrush lizards were observed during this study and Stebbins (1966) did not include this area in the distribution of the sagebrush lizard, it was concluded that the only lizard found on the study area is the short-horned lizard (*Phrynosoma douglassi*). The short-horned lizard, also called the "horny toad" by local residents, is a reptile of "special interest" for North Dakota (McKenna and Seabloom, 1976). One "horny toad" was seen near the northern Montana boundary of the study area by Roberts (pers. comm., 1978) during the initial stages of the Wibaux study. No other "horny toads" were seen; even though, considerable time was spent around rocky outcrops and bluffs looking specifically for lizards and snakes. In turn, the "horny toad" was classified as scarce.

Four racers (Coluber constrictor) were observed. All of these individuals were found in upland grassland. Since only four racers were seen, it was classified as uncommon.

The hognose snake (Heterodon nasicus is a reptile of "special interest" to Montana. At present, Montana lists the hognose snake as suspected occurrence in Wibaux County (Flath, 1978a). One hognose snake was collected for this study, but it was found in Golden Valley County, North Dakota. Also, two more hognose snakes were road-kills near the same site (Melvin, pers. comm.). Seabloom, et. al. (1978) collected hognose snakes in Golden Valley County in their study, but found them uncommon in the area and sparse where found. Several local residents reported that the hognose snake occurs in Wibaux County, but they only encountered one every few years. From this, it was decided to classify the hognose snake as scarce.

The bull snake (Pituophis melanoleucus) was seen in practically all habitats. Most of the observations occurred in the upland grassland and nonirrigated small grain habitats, but it was often found around old farm buildings and barns by local residents. The bull snake was classified as a common reptile.

Two species of garter snakes are known to occur on the study area. Both Stebbins (1966) and Davis and Weeks (1963) list the common garter snake (Thamnophis sirtalis) and the plains garter snake (Thamnophis radix) as

occurring on the study area. The plains garter snake was common-abundant, but the common garter snake was not found during the study. Although both species occur around water, the plains garter snake is normally more terrestrial than the common garter snake. Most of the plains garter snake specimens (about 30 - 35) were collected around Odland's Reservoir and Beaver Creek. If the common garter snake is found on the study area, it is much less common than the plains garter snake.

The rattlesnake (Crotalus viridis) was found mostly in the upland grassland and rocky bluffs near the northern Montana boundary of the study area. Four rattlers were encountered one afternoon in the rocky bluffs at T. 15 N., R. 60 E., Section 5, which is reason to suspect a possible den site there. Wood (pers. comm.) said that a den site is also located at T. 16 N., R. 60 E., Section 28, adjacent to the study area boundaries; however, he was not certain if it was still active. Seabloom, et. al. (1978) located seven rattlesnake dens in Golden Valley County, North Dakota, but only one den site appeared to be within this study area's boundaries. Based upon the above information, the rattlesnake was classified as common.

Several other "special interest" reptiles are listed by the states of Montana and North Dakota; however, the study area was so distant from the distribution of those reptiles that a separate discussion was not justified.

Birds

SPECIES ACCOUNT - BY FAMILIES

One hundred forty-nine species of birds were identified on the study area. These birds, plus data on their status and relative abundance, are presented in Appendix F. Status and relative abundance was determined by the frequency of incidental observations and route data observations. Fifteen species of birds are classified as special status species, i.e., they are classified as threatened or endangered by the Federal Register or they are "special interest" species for the states of Montana or North Dakota. Seven species are recognized as threatened or endangered species by the federal government; while, five species are "special interest" species for Montana and three species are "peripheral" species for North Dakota. The majority of these special status species are raptors.

Specific data on loons, grebes, pelicans, cormorants, herons, waterfowl, raptors, game birds, and cranes were incorporated into the game species study (see Munson, 1979); however, some of this data is included in this report, such as the number of birds observed/stop for route data, etc. Nesting birds found on the study area are listed in Appendix G.

Two species of rails were observed on the study area. As only one sora (Porzana carolina) was observed during the study period, this would indicate that the sora is rare for this area, but this is not the case. In fact, the sora is one of the most common rails, but it is seldom seen because of its highly secretive nature (Robbins, et. al., 1966, and

Seabloom, et. al., 1978). Stewart (1975) listed the sora as a common to fairly common breeding bird throughout most of North Dakota and uncommon and local for southwest North Dakota. Therefore, the sora was classified as uncommon. The coot (Fulica americana) was the other rail observed on the study area. Over 1,000 coots were counted in 60 observations during the study. Also, numerous adults were seen with dependent young in the reservoirs and creeks. In turn, the coot was classified as an abundant breeding bird for the area.

Three species of plovers were observed. Small flocks of American golden plovers (Pluvialis dominica) and black-bellied plovers (Pluvialis squatarola) were observed during their migration in May. Both species stayed a day or two and then continued their migration. The other plover, the killdeer (Charadrius vociferus), was quite abundant and was often seen in the small grain fields, in addition to the wetland habitats. Also, several adults were seen with dependent young from May through July.

Ten species of sandpipers were seen on the study area. Most of the species were classified as uncommon spring migrants, except for the greater yellowlegs (Tringa melanoleuca), the pectoral sandpiper (Calidris melanotos) and the long-billed dowitcher (Limnodromus scolopaceus). The pectoral sandpiper and the long-billed dowitcher were classified as scarce as only one or two observations were made of these species. Greater yellowlegs were classified as common and were observed the entire summer. Although Stewart (1975) does not list the greater yellowlegs as a breeding bird in North Dakota and no nesting or dependent young were seen during this study, there is a good probability

that the greater yellowlegs is a breeding bird for the area since it was observed during all the summer months.

The remaining shorebirds that were seen are the American avocet (Recurvirostra americana) and Wilson's phalarope (Steganopus tricolor). The American avocet was classified as uncommon because of the low frequency of observations, even though one pair of adults with dependent young were seen during July. Wilson's phalaropes were common and were seen the entire summer. No breeding evidence was observed during the study, but Stewart (1975) listed Wilson's phalarope as an uncommon local breeder for this portion of North Dakota.

Three species of gulls and three species of terns were seen. Most of the gulls and terns were uncommon or scarce, except for the ringbilled gull (Larus delawarensis) which was relatively common. The majority of gulls and terns were seen at Odland's Reservoir.

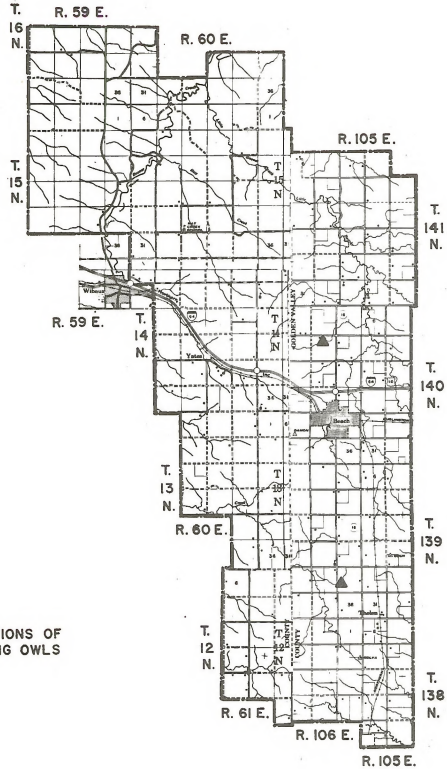
The two species of doves observed were the rock dove (Columba livia) and the mourning dove (Zenaidura macroura). The rock dove was quite common and was generally seen around homesites, old buildings, and bridges. The mourning dove was an extremely abundant summer resident. Over 1300 individuals were observed in 278 observations. Also, nesting and dependent young were observed from May-July.

Only two observations of black-billed cuckoos (Coccyzus erythropthalmus) were made during the study period. One individual was seen during June;

while, the other individual was seen during July. Both Swenson (1978) and Seabloom, et. al. (1978) classified the black-billed cuckoo as uncommon for their studies. Since this study area was actually between Seabloom's study sites in North Dakota and Swenson's study area at Intake, Montana, it was also classified as uncommon rather than scarce.

Four species of owls were seen. The great horned owl (Bubo virginianus) was common; the short-eared owl (Asio flammeus) and the burrowing owl (Athene cunicularia) were uncommon; and the snowy owl (Nyctea scandica) was quite scarce. Only one observation was made of a snowy owl during December, 1977. The snowy owl was once classified as a "special interest" species (Flath, 1978a); however, it was recently removed from this "special interest" status (Flath, 1979a). The burrowing owl is also a "special interest" species for Montana (Flath, 1979a). Seven observations of 18 individuals were made during the study period. These observations clustered around two locations in North Dakota (Figure 6). The earliest observation was May 9, 1978, and the latest observation was September 13, 1977. Even though no actual breeding evidence was found, the burrowing owl is a probable breeder on the study area as most observations clustered around two locations and the period of the observations coincides with their breeding season (Stewart, 1975).

The common nighthawk (Chordeiles minor) was the only goatsucker that was seen. It was an uncommon species with only six observations recorded during the study. The majority of these observations were around aquatic habitats where several individuals were seen at dusk. The poor-will



LEGEND

▲ OBSERVATIONS OF BURROWING OWLS

OBSERVATIONS OF BURROWING OWLS

FIGURE 6

(Phalaenoptilus nuttallii) was another species of goatsuckers that probably occurs on the study area, although it was not found. Skaar (1975) listed the poor-will as a probable breeding species for several of the latilongs around the Wibaux latilong, plus Stewart (1975) listed the poor-will as a species that breeds regularly in the badlands along the Little Missouri River in Slope County.

One hummingbird was observed in the upland-grassland. Unfortunately, the hummingbird was not identified to species. Skaar (1975) listed six species of humingbirds for Montana, but there are few records for any of these species in eastern Montana. Based on the distribution maps of Robbins, et. al. (1966), Skaar (1975) and Stewart's (1975) records, the hummingbird was probably either a ruby-throated hummingbird (Archilochus colubris) or a calliope hummingbird (Stellula calliope). Also, Cameron (1907) listed both species as rare species for Custer and Dawson Counties, but stated both were definite occurrences and possible nesting birds.

Belted kingfishers (Megaceryle Alycon) were a relatively common species around the aquatic habitats. Skaar (1975) listed the belted kingfisher as a probable breeder for the Wibaux latilong. Although no actual breeding evidence was seen during this study, most of the observations were made along Beaver Creek in an area where there are several large banks and cliffs with deep cavities. According to Udvardy (1977), the belted kingfisher usually nests in a long tunnel excavated in a bank. This area along Beaver Creek represents the best potential for nesting sites of the belted kingfisher.

Several species of woodpeckers were found during the study. The common flicker (Colaptes auratus) was very common, particularly around the creek bottom and woody draws. The nest cavity of a pair of common flickers was located in a large cottonwood snag along the creek bottom; however, the reproductive success of this nest site was unknown. The hairy woodpecker (Picoides villosus) was uncommon; whereas, the red-headed woodpecker (Melanerpes erythrocephalus) was quite scarce on the study area. Even though the downy woodpecker (Dendrocopos pubescens) was not seen, this species probably occurs around the Wibaux area as Swenson (1978) found them at Intake.

Five species of flycatchers were identified. The Eastern kingbird (Tyrannus tyrannus) and Western kingbird (Tyrannus verticalis) were very common. Although there was some overlap in habitat preference of these two species, the Western kingbird was more common around homesites and windrows in the southern portion of the study area; whereas, the Eastern kingbird was more common around the creek bottom and upland grassland in the northern portion. Both species of kingbirds nested on the study area. Say's phoebe (Sayornis saya) was relatively common in the upland grassland and small-grain fields; while, the least flycatcher (Empidonax minimus) and the Western wood pewee (Contopus Sordidulus) were confined to the creek bottom.

The most abundant species found on the study area was the horned lark (Eremophila alpestris). Horned larks were observed in virtually every habitat, but showed a preference for open areas such as the small grain

fields and upland grassland. Although it was observed year-round, it was dominant during the winter months. Peak numbers were recorded during March when large flocks migrated into the area. This was consistent with Thompson's (1978) findings, who also found the horned lark as a dominant winter species with peak numbers in March. Adults with dependent young were recorded in early May. Over 6,000 individuals were recorded in 845 observations. In turn, the horned lark was designated as an indicator species, i.e., a species that consistently attained maximal numbers and sightings.

Five species of swallows were seen. The tree swallow (*Iridoprocne bicolor*) was only observed twice, but the other four species were much more common. Three of the five species of swallows nested on the area. A colony of bank swallows (*Riparia riparia*) nested in the steep cliffs along Beaver Creek and although no rough-winged swallows (*Stelgidopteryx ruficollis*) were seen nesting, they were often seen around these same cliffs. Unlike the bank swallow, a colonial nester, the rough-winged swallow usually nests in scattered solitary pairs with nesting burrows constructed in vertical banks along streams (Stewart, 1975). Since rough-winged swallows were observed during their breeding season as cited by Stewart (1975) for this area, they were listed as a probable breeding species. The barn swallow (*Hirundo restica*) nested in old buildings and barns, and colonies of cliff swallows nested under bridges and in the banks around Odland's Reservoir.

The black-billed magpie (*Pica pica*) was a very common year-round resident,

normally confined to the creek bottom and hardwood draws. Thompson (1978) found similar results near Circle, Montana. The common crow (Corvus brachyrhynchos) was a relatively common spring and fall migrant. Although most of the observations were of small numbers of crows, several large flocks were seen during the fall in recently harvested small grain fields.

Although the black-capped chickadee (Parus atricapillus) was relatively common, most of the observations occurred in the creek bottom and adjacent hardwood draws during the winter and early spring. Only one black-capped chickadee was seen in these areas during the summer months. Kroodsma (1973) found that black-capped chickadees were more numerous in the mature cottonwood forests during June and July and the only area with mature cottonwoods on the study area was a very small tract along Beaver Creek.

House wrens (Troglodytes carolinensis) arrived in early May and remained through August. Although no breeding evidence was observed, this period coincides with their breeding season as cited by Stewart (1975). In all likelihood, house wrens nested on the study area. The majority of the observations were on the creek bottom and adjacent woody draws.

Catbirds (Dumetella carolinensis) and brown thrashers (Toxostoma rufum) were fairly common in the brushy areas and thickets along Beaver Creek. Both species arrived in early May and remained through August. This period coincides with their breeding season (Stewart, 1975). Although no nests were located, territorial pairs of both species were observed.

Robins (Turdus migratorius) were very abundant. In addition to nesting on the area, some robins wintered there. Hermit thrushes (Catharus guttata) were observed along Beaver Creek. According to Skaar (1975), there are few sightings of the hermit thrush east of the Continental Divide in Montana. Since this species was seen in the same area along Beaver Creek and all the observations occurred within a few days, it was determined that the hermit thrush was a scarce spring migrant. Mountain bluebirds (Sialia currucoides), a "special interest" species for Montana, were among the first birds to return in the spring. In actuality, these birds returned during early March, long before spring arrived. Skaar (1975) listed the mountain bluebird as a probable breeding bird for the Wibaux latilong. None were observed on the study area during the breeding season, but they were seen during two consecutive years on the Savage 024 breeding bird route.

Swenson (1978) listed the water pipit (Anthus spinoletta) as a rare spring migrant of the Intake area; however, they were only seen during September in this study when small numbers of water pipits migrated through the Wibaux area. Most observations were made around small grain fields.

The starling (Sturnus vulgaris) is totally unprotected by Montana Fish and Game laws. Yet, starlings were one of the most abundant birds on the study area. As expected, the majority of the observation were made around homesites, feedlots, old buildings and in town. The only nest site of starlings was located in an old cottonwood snag.

The solitary vireo (Vireo solitarius) was the only vireo that was seen. There were only two observations of this species and both were made on consecutive days in May along Beaver Creek. According to Skaar (1975), there are few records of sightings of the solitary vireo in eastern Montana; however, Seabloom, et. al. (1978) also observed the solitary vireo in their southwestern North Dakota study.

Five species of warblers were identified. The majority of the warbler observations were made along Beaver Creek and nearby woody draws. Yellow warblers (Dendroica petechia) were very common; whereas, American redstarts (Setophaga ruticilla) and yellow-breasted chats (Icteria virens) were scarce. This was not expected because Kroodsma (1973) and Swenson (1978) found that American redstarts were moderately common and uncommon, respectively, and yellow-breasted chats were common in their studies. The other two species of warblers were uncommon. One of these species, the yellow-rumped warbler (Dendroica coronata), is a "special interest" species for North Dakota; however, they recognize Audubon's warbler (Dendroica coronata auduboni) as a "special interest" species.

House sparrows (Passer domesticus), another pest species in Montana, were very abundant. They were year-round residents of the area, with large flocks wintering in old buildings, barns, and town. Flocks of several hundred individuals were commonplace around the towns of Wibaux and Beach.

The blackbird and oriole family was well represented by nine species.

Bobolinks (Dolichonyx oryzivorus), a "special interest" species for Montana, and orioles were the least common species; while, western meadowlarks (Sturnella neglecta) and red-winged blackbirds (Agelaius phoeniceus) were the most abundant species. Three species of this family were observed nesting on the area and all other members were suspected of nesting. Skaar (1975) listed all these species as breeding or probable breeding birds for the Wibaux latilong.

Fringillids (grosbeaks, finches, sparrows, and buntings) comprise the largest family of North American birds (Robbins, et. al. 1966). Twenty-one species of fringillids were observed during this study. Although a few of these species were scarce, the majority were common-abundant. Three species of sparrows are "special interest" species for Montana; however, the field sparrow (Spizella pusilla) was the only one of the three that was observed, and it was very common during the summer months. There are two species of sparrows of "special interest" for North Dakota, but neither species were observed.

Of the 149 bird species that were observed on the study area, 113 species (75.8%) were seen on one or both roadside wildlife routes. This figure coincides closely with Thompson's (1978) bird route efficiency. Seventy-eight species were seen on both routes. The southern route contributed an additional 12 species; while, the northern route added 23 more species of birds. The majority of the additional species that were seen on the northern route were either aquatic or woodland species. This was expected since this route sampled more of these habitats than the southern route. Of 6,979 observations, 4,920 (70.5%) were obtained by the roadside survey technique. Although other species of animals were included in this figure, the majority (90% or better) of the observations are of birds.

Data on bird species that were observed during the monthly replications of the two wildlife survey routes was summarized for April-Sept. 1978 and presented in Table II. On the northern route, total bird species ranged from 28-56 species with a mean of 43 species per month for the six month period. Total individuals ranged from 885-2816 individuals with a mean of 1650.5 individuals. On the southern route, total bird species ranged from 28-44 species with a mean of 38.5 species per month and total individuals ranged from 1169-2024 individuals with a mean of 1449.8 individuals.

Table II. Summary of Roadside Survey for Birds (April-September 1978).

	April	May	June	July	August	Sept
North	42 Species	46 Species	56 Species	41 Species	45 Species	28 Birds
	2.816 Ind.	885 Ind.	2,434 Ind.	1,308 Ind.	1,564 Ind.	896 Ind.
	40.2 birds/stop	12.6 birds/stop	34.8 birds/stop	18.7 birds/stop	22.3 birds/stop	12.8 birds/stop
South	44 Species	38 Species	41 Species	42 Species	38 Species	28 Species
	2024 Ind.	1193 Ind.	1169 Ind.	1317 Ind.	1803 Ind.	1193 Ind.
	28.9 birds/stop	17.0 birds/stop	16.7 birds/stop	18.8 birds/stop	25.8 birds/stop	17.0 birds/stop

Certain species were designated indicator species, i.e., those species that were consistently sampled in great numbers along a route, for the north and south route and listed in Table III. Indicator species were selected by their frequency of observations, total numbers, and seasonal status. Horned larks and house sparrow were resident indicator species and western meadowlarks were summer resident indicators.

The Savage 024 Breeding Bird Survey Route extended in the northern boundary of this study area. The route was run several times since 1968 and was also run in 1978 for this study. Previous data was obtained from the U.S. Fish and Wildlife Service and is presented in Appendix C. Data from 1978 compared favorably with the 1977 data, differing in only a few species and numbers. This also compared favorably with data from the northern and southern route of this study area for July, especially for total species and birds/stop; however, routes on this study area were 70 stops long; whereas, the Savage Route is 50 stops long.

Route data and specific location data was combined and the results for total species of birds presented in Figure 7. Total species ranged from a low of 10 species of birds for February and a high of 106 species of birds in May.

TABLE III. List of Indicator Species for the Roadside Survey Routes.

NORTH ROUTE	SOUTH ROUTE
House Sparrow - R	House Sparrow - R
Ring-necked Pheasant - R	Horned Lark - R
Robin - R	Common Redpoll - W
Horned Lark - R	Mourning Dove - S
Snow Bunting - W	W. Meadowlark - S
Mourning Dove - S	Mallard - S
W. Meadowlark - S	Red-winged Blackbird -
S Mallard - S	
Pintail - S	

R - year-round resident

W - winter species

S - spring-summer resident

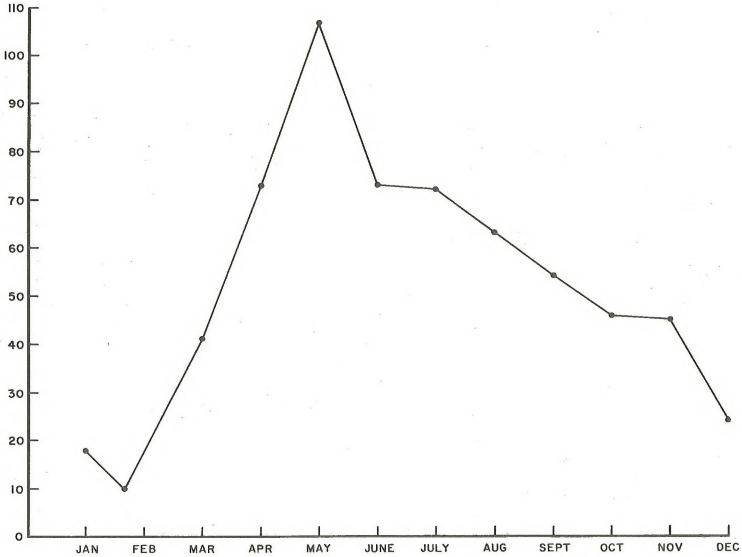


FIGURE 7

NUMBER OF BIRD SPECIES OBSERVED
ON THE STUDY AREA BY MONTHS

Mammals

Species Account

Thirty-five species of mammals were identified on the study area. These mammals, plus data on their status, abundance, and total sightings, are presented in Appendix H. Status and relative abundance was determined by their frequency of incidental observations, route data observations, and trap data. Three endangered mammalian species are addressed in this report; however, they were not found on the study area. Four of the non-game species are classified as "special interest or concern" species -- three for Montana and one for North Dakota. Several other "special interest" species have ranges or former ranges in the Wibaux-Beach area, but they were not found during this study. Specific data on prairie dogs, beaver, antelope, white-tail deer and mule deer were incorporated into the game species report (see Munson, 1979).

According to the distribution maps of Burt and Grossenheider (1976), two species of shrews occur on the study area. Thompson (1978) captured one speciman of Merriam's shrew (Sorex merriami) at Circle, Montana, but this species was not found during this study. Merriam's shrew is quite rare in Montana (Hoffman and Pattie, 1968) and prefers arid areas such as sagebrush or bunchgrass. This vegetative type was very limited and restricted on the study area so it is doubtful whether Merriam's shrew occurs there. The masked shrew (Sorex cinerus) was captured in all habitats, except the upland grassland. Lampe, et. al. (1974) obtained better results using pitfalls for shrews than museum special snap

traps; however, in this study only two shrews were captured in pitfalls, while the others were taken with museum special snap traps. Undoubtably, pitfalls are an effective technique for shrews (Brown, 1967 and Spencer and Pettus, 1966) but their efficiency (2 captures/132 trap nights) did not justify the time and effort expended on them during this inventory. Hall (1962) recommended the regular mouse trap as satifactory for shrews. Perhaps, regular mouse traps interspersed with rat traps, museum special snap traps, and Sherman live traps would be a more satisfactory combination of traps for small mammals for future inventories.

Even though considerable time and effort was expended on bat collection, only one bat was taken. No bats were even seen, although several nights in mid-July were spent around reservoirs, Beaver Creek, and streetlights in town. The only bat that was collected was killed in an old barn by a rancher. This specimen was an adult long-legged bat (*Myotis volans*). This species is a "special interest" species for Montana, but it is probably relatively common for eastern Montana. Jones, et al. (1973) and Lampe, et al. (1974) found the long-legged bat common in Carter County, plus Swenson (1977) listed it as common for Yellowstone County. Based on the distribution maps of Burt and Grossendeider (1976) Hoffman and Pattie (1968), and Hoffman, et al. (1969), other species of bats that likely occur on the study area are the following: little brown bat (*Myotis lucifugus*), Keen's bat (*Myotis keenii*), long-eared bat (*Myotis evotis*), small-footed bat (*Myotis leibii*), big brown bat (*Eptesicus fuscus*), hoary bat (*Lasiurus cinereus*) and silver-haired bat (*Lasionycteris noctivagans*). Very little work has been done on the abundance and

distribution of bats in eastern Montana so this list is only tentative and subject to change when additional information warrants such. One of the above listed species, Keen's bat, was recently collected in Richland County (Swenson and Shanks, 1979). This was the first record of this species for Montana.

Three species of rabbits were identified. Whitetail jackrabbits (Lepus townsendii) were very common, particularly on the southern portion of the study area around wheat fields, windrows, and upland grassland. The other two species of rabbits were the desert cottontail (Sylvilagus auduboni) and the mountain cottontail (Sylvilagus nuttalli). Fourteen cottontails were collected with a .22 caliber rifle for identification purposes. Four cottontails were desert cottontails and the remainder were mountain cottontails. Desert cottontails were collected around wheat fields and upland grassland in the southern and eastern portion of the study area; whereas, mountain cottontails were collected along creek bottom habitat in the northern portion of the study area in Montana. The mountain cottontail, a "special interest" species for North Dakota, was not collected in North Dakota. The last known record for a mountain cottontail in North Dakota was 1926 (Seabloom, et al., 1978), but there is a good probability that they exist just north of the study area in North Dakota in woody draws and mesic shrub vegetation types. This area is less than 10 miles from the Montana collection sites used for this study.

Four species of the squirrel family were observed. Thirteen-lined ground squirrels (Spermophilus tridecemlineatus) and least chipmunks (Eutamias minimus) were very common in upland grassland and creek bottom, respectively. Only two fox squirrels (Sciurus niger) were seen. One was a road kill in the town of Beach, N.D. and the other one, also a road kill, was found approximately seven miles north of Beach. This was unusual because this area was mostly small grain fields and pasture. The closest trees, other than a few windrows, were in Beach, N.D. Data on the black-tailed prairie dog (Cynomys ludovicianus), a special interest" species for Montana, were incorporated into the game species report (see Munson, 1979).

Since the northern pocket gopher (Thomomys talpoides) is the only pocket gopher for this region, very little time was spent sampling for data on this species. Six were captured with Mac Abee pincher traps for identification purposes. Pocket gophers, a pest in farmland, were very common in upland grassland and small grain fields, especially alfalfa fields. Some of the farmers controlled the pocket gophers in their fields with traps, but poison was utilized for pocket gopher control by some farmers in past years.

The only pocket mouse (Perognathus fasciatus) that was captured was taken while walking across a recently cut wheat field. None were taken in almost 10,000 trap nights of small mammal trapping. Although Ord's kangaroo rat (Dipodomys ordi) was not taken, it's distritution extends

through the study area (Burt and Grossenheider, 1976). Swenson (1978) caught Ord's kangaroo rats in sandy areas of upland grassland around Intake, and Seabloom, et al. (1978) collected specimens from seeded croplands, roadsides, and upland grassland in southwestern North Dakota. They were common to locally abundant in Slope and Bowman Counties, North Dakota. Ord's kangaroo rat probably also occurs on this study area, even though it was not found.

Data on Beavers (Castor canadensis) were incorporated into the game species report (see Munson, 1979). Harvest data, obtained from Montana Fish and Game Department, is included in this report in Appendix I.

Eight species of cricetids (new world mice) were observed. Grasshopper mice (Onychomys leucogaster), Western harvest mice (Reithrodontomys megalotis), and sagebrush voles (Lagurus curtatus) were scarce with only a few specimens taken during small mammal trapping. Other species of cricetids were common-abundant. Deer mice and white-footed mice were extremely difficult to differentiate in the field. Both species were identified in Peromyscus spp. samples from representative habitats that were sent to Montana State University Zoological Museum (MSUZM). Only one white-footed mouse was identified in the samples, so it was classified as scarce. Meadow voles (Microtus pennsylvanicus) and prairie voles (Microtus ochrogaster) were also difficult to distinguish so they were recorded as Microtus spp. Based on the samples that were sent to MSUZM, both species were captured with the meadow vole more numerous than the

prairie vole. However, both species were classified as very common. No bushy-tailed wood rats (Neotoma cinerea) were captured; even though, wood rats were seen by ranchers/farmers in old buildings in past years. Rat traps were set in old buildings and rocky bluffs in an attempt to verify their presence but the results were negative. One bushy-tailed wood rat was captured in rocky outcrops similar to the study area trap sites near Terry, Montana (Matthews, unpub. data), plus Swenson (1978) and Lampe, et al. (1974) found them at Intake and Ekalaka, respectively. This species likely occurs on the study area but it is probably scarce-uncommon.

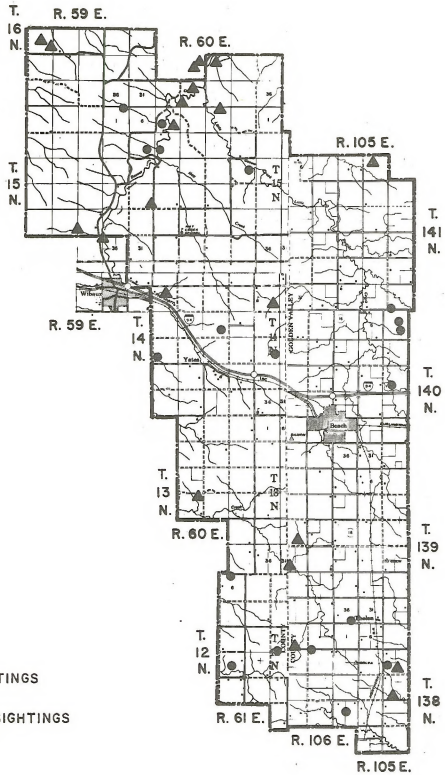
Two house mice (Mus musculus) were trapped around a wheat field and the Wibaux dump. House mice are probably relatively common around homesites and barns but the only trapping done around these sites was brief special trap periods. No norway rats (Rattus norvegicus) were observed, but one farmer reported large rats around his barns until he poisoned them. These large rats were probably norway rats.

Meadow jumping mice (Zapus hudsonius) are a "special interest" species for Montana. Hoffman and Pattie (1968) reported that the meadow jumping mouse is a species little known in Montana, apparently uncommon, and restricted to the eastern quarter of the state. Lampe, et al. (1974) trapped 33 specimens near Ekalaka and Flath (1979a) made reference to a specimen that was taken on Bowdoin National Wildlife Refuge in 1974.

These were the only sources found reporting the meadow jumping mouse and it's status in eastern Montana. During this study, six specimens were trapped in several different vegetation types in creek bottom habitat in Wibaux County, Montana, and six additional specimens were taken in Golden Valley County, North Dakota. The majority of the specimens were taken in areas with thick, tall grass. In addition, this species was only captured during July and August. Eleven of these specimens were sent to MSUZM for positive identification and storage. Consequently, meadow jumping mice were classified as uncommon; even though, they are a "special interest" species in Montana.

Porcupines (Erethizon dorsatum) were relatively common around the creek bottom and woody draws. The majority of the porcupines observed were dead - either road kills or shot by a gun. Also, most of these observations occurred in the early spring and tapered off afterwards.

Two species of canids were observed. Red fox (Vulpes fulva) and coyotes (Canis latrans) were relatively common with about an equal number of observations of each species. Locations for both species are shown in Figure 8. "Coyote getters" were used by several ranchers near the northern boundary to control the coyote population. Additional data on these two species and their annual harvest was obtained from Montana and North Dakota Fish and Game Departments and is included in Appendices I and J. The swift fox (Vulpes velox) is an endangered species. At one time, the swift fox was thought extinct in Montana (Hoffman and Pattie, 1978); however, an adult male swift fox was taken in southwestern Custer



LEGEND

● FOX SIGHTINGS

▲ COYOTE SIGHTINGS

COYOTE AND FOX SIGHTINGS

FIGURE 8

County in March, 1978 (Flath, 1979a). Although the study area is within the swift fox's former range, it is extremely unlikely that this species exists there. The gray wolf (Canis lupus) is another threatened species that would be extremely unlikely of occurring on the study area. A wolf was killed near Glasgow (150-200 miles northwest) in 1978 but this was probably an unusual sortie by a lone wolf from Canada (Flath, 1979b).

Only seven observations of raccoons (Procyon lotor) were recorded during the study. Raccoons were probably more common than this figure indicates because they are nocturnal and sleep during the coldest part of the winter months (North Dakota Fish and Game dept. Education Series 10). Still, they were classified as uncommon because of the lack of wooded areas on the study area. Additional data on raccoons and their annual harvest was obtained from Montana Fish and Game Department and is included in Appendices I and J.

Five species from the weasel family were observed. Only one badger (Taxidea taxus) was seen but several were trapped by local residents. The other species were uncommon-common. Additional data on these species is in Appendices I and J. The black-footed ferret (Mustela nigripes), an endangered species, is also a member of this family. There is only one confirmed sighting of a black-footed ferret in Montana since 1953 and 41 confirmed sightings from 1910-1953 (Martin, 1978). None of these sightings were in Wibaux County. Since there was only one small (5-10 acre) prairie dog town on the study area, it is highly improbable that

the black-footed ferret exists there. Particularly noteworthy was the capture of a least weasel (Mustela nivelis), a "special interest" species in Montana. Hoffman and Pattie (1968) classified the least weasel as an uncommon to rare species for this area.

No bobcats (Lynx rufus) were observed but one rancher did shoot a young bobcat during the 1977 trap season (Schieffer, pers. comm.). Local residents reported that there were a few bobcats along the Beaver Creek drainage. Annual harvest data is included under the trap data section.

Whitetail deer (Odocoileus virginianus), mule deer (Odocoileus hemionus), and antelope (Antilocapra americana) are game species and are addressed in the game species report (see Munson, 1979).

TRAP DATA

Small Mammal Trapping

A total of 9,806 trap-nights for small mammals were completed during the study. For most of the trapping, 100 traps were set in 10 vegetative types for three trap-nights. Each vegetative type was trapped during a fall, spring, and summer season. There was some deviation from this pattern at the beginning of the study, plus special trap periods were set up to collect data on specific mammals. This accounted for the additional 806 trap nights. There were 840 captures which resulted in an 8.57 capture/ 100 trap night efficiency. Fourteen species of small

mammals, five species of birds, three species of amphibians, and one reptile were captured (Table IV). Peromyscus spp. and Microtus spp. were the most abundant species. Seasonal results were combined for the ten vegetative types and are in Appendix Table K.

Furbearers

Annual harvest data on furbearers and other fur-interest species (mammals that are normally harvested for their pelts) was obtained from Montana and North Dakota Fish and Game Departments. This was done, rather than trapping the study area for these species because this data was readily available and to avoid any conflict of interest with local trappers.

Annual fur harvest for Region 7 which includes Richland, Dawson, Wibaux, Fallon, Carter, Prairie, Custer, Powder River, Rosebud, Garfield, Big Horn, and Treasure Counties is listed in Appendix Table I. The most important fur-bearing species of Region 7 were the coyote and red fox, both in number harvested and total market value of pelts. Annual harvest data from North Dakota was only available for coyotes and red fox that were taken by hunters and trappers over the entire state during the 1976 and 1977 trapseason; however, the number of licensed trappers in Golden Valley County was obtained and incorporated into Appendix Table I. The average catch per hunter or trapper in North Dakota is approximately 1.9 red fox and 0.6 coyote per year. The success of most of the trappers on the study area in Golden Valley was considerably greater than this.

TABLE IV. SMALL MAMMAL TRAP DATA

Species	Male	Female	Total	% of Capture
Peromyscus spp.*	332	281	613	73.0
Microtus spp.*	68	68	136	16.2
Least chipmunk	11	7	18	2.1
Masked shrew	7	9	16	1.9
13-lined ground squirrel	4	10	14	1.7
Meadow jumping mouse	6	6	12	1.4
Grasshopper mouse	1	1	2	0.2
House mouse	2	-	2	0.2
W. harvest mouse	2	-	2	0.2
Pocket gopher	-	1	1	0.1
Sagebrush vole	1	-	1	0.1
Least weasel	1	-	1	0.1
Tree sparrow			4	0.5
Field sparrow			2	0.2
Catbird			1	0.1
Black-capped chickadee			1	0.1
Savannah sparrow			1	0.1
Leopard frog			10	1.2
Spadefoot toad			1	0.1
Tiger salamander			1	0.1
Plains garter snake			1	0.1
23 species			840	99.7

* Two species - see species account in text for explanation.

Undoubtedly, the hunter/trapper success varies with the skill of the individual, weather, abundance, area, et cetera. One trapper in Golden Valley County collected over 35 red fox, 17 coyotes, five raccoons, six skunk and one badger on the study area during the 1977 and 1978 trapping season (Melvin, pers. comm.). With today's price for prime pelts, it is easy to see the value of the furbearer resource in this area.

Existing Habitat Status and Conflicts

A brief summary of the four major habitats is presented in this section. Characteristic species for each habitat plus primary indicator species are listed below.

Small Grain Fields

Small grain fields were the most extensive habitat type (58 per cent) on the study area. Although 121 species were observed in this habitat, very few were resident species. Since waterfowl and shorebirds utilized temporal pools and flooded fields during the spring and migratory birds used these areas after the grain was harvested in the fall, these areas were important to wildlife as season-use areas for these periods. Characteristic species were:

Yearlong Residents: horned lark, deer mouse, *Microtus* spp., white-tailed jackrabbit.

Summer Residents: western meadowlark

Winter Residents: snow bunting, common redpoll

Upland Grassland

Upland grassland (38 percent of the study area) was found mostly on the north end of the study area. This habitat interspersed with woody draws was prime habitat for several game and non-game species. Characteristic species were:

Yearlong Residents: horned lark, white-tailed deer, sharp-tailed grouse, deer mouse.

Summer Residents: western meadowlark, mourning dove, lark bunting.

Winter Residents: common redpoll

Grassland Coulee

Grassland coulees comprised only two percent of the study area. These coulees provide drainage during spring run-off and were scattered throughout the study area. Characteristic species were:

Yearlong Residents: *Microtus* spp.

Summer Residents: red-winged blackbird

Winter Residents: common redpoll

Creek Bottom

Although this habitat only comprised two percent of the study area, this area was very important for the majority of the wildlife species. The woody draws, mesic shrub communities, and large cottonwoods interspersed with wheat and hay fields provided excellent wildlife habitat. Characteristic species were:

Yearlong Residents: white-tailed deer, ring-necked pheasant, robin, cottontail, deer mouse.

Summer Resident: mourning dove, red-winged blackbird

Winter Residents: tree sparrow, black-capped chickadee

Important seasonal use areas were temporal ponds and flooded small grain fields that were formed by spring runoff. The study area lies within the migration routes of many shorebirds and waterfowl. In turn, these areas were utilized by these species for resting and feeding while enroute to Alaska and Canada.

Although the entire creek bottom habitat is extremely important to the wildlife species, only two sections were designated crucial areas. Munson (1979) designated Section 18 of T.15N., R.60E. as a crucial area for white-tailed deer. This Section, plus Sec. 24 of T.15N., R.59E., was extremely important to non-game birds and mammals. Large cottonwoods on these sections provided perches for raptors while hunting, and nesting sites for many passerine birds. Steep banks along these sections were utilized by bank swallows, plus several other species, for nesting. The woody draws and mesic shrub communities provide escape cover for many non-game mammals such as cottontails, while doubling as the hunting areas for their predators.

Most of the habitat problems and conflicts for wildlife species were agriculture-related. Many of the wooded areas were cleared and native grassland were plowed under for small-grain fields during the study period. This reduction of these areas and replacement of them with wheatfields is detrimental to most of the wildlife species because it eliminates their escape cover, nesting sites, and natural forage. An additional habitat problem that was noted was the drainage of wetlands to plant more crops. These areas are essential to nesting waterfowl and shorebirds. Further reduction of these wetlands will most definitely be detrimental to these species.

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Appendix A. Pertinent Definitions.

1. Habitat - The food, water, cover, and space necessary for existing wildlife species.

2. Seasonal Use Areas - Areas which are normally used and can be separated by seasons of the year, such as winter, summer, yearlong, etc.

3. Crucial Areas - Parts of the habitat which are necessary to sustain the existence and/or perpetuation of a wildlife species at critical periods during its life cycle or those factors needed to maintain a healthy wildlife population in their normal life cycle, e.g., antelope kidding grounds, fish spawning areas, prairie chicken booming grounds, sage grouse strutting grounds, sharptail grouse dancing areas, etc.

4. Special Areas - Areas which have been withdrawn, designated or otherwise specially identified for the protection of a wildlife species.

5. Introduction Areas - Areas where non-native wildlife species have been introduced and become established.

6. Reintroduction Areas - Areas where an endemic species is released into a habitat in which it previously existed.

7. Migration Routes - Areas traversed by wildlife populations in their periodic movement from one seasonal use area to another, commonly used from year to year.

8. Habitat Problems - Habitat components which are creating a limiting influence on the wildlife population.

9. Habitat Conflicts - Uses of the habitat which create an adverse impact upon the wildlife species.

10. Potentially Suitable Habitat - Areas which may have potential for providing additional suitable habitat for a species if the unsatisfactory conditions are corrected. These areas may also be favorable habitat for an individual wildlife species which does not occupy it at the present time.

Appendix B. Soils of Wibaux County, Montana.

Farland-Savage-Harlem - These soils are found on the bottomlands and low terraces of Beaver Creek and its main tributaries. They are highly productive, silty alluvium soils with a high organic matter content. A large amount of cultivation occurs on these soils.

Flasher-Vebar - These are scattered areas of sandy soil. Although some of these soils are tilled, most of them support native grasses.

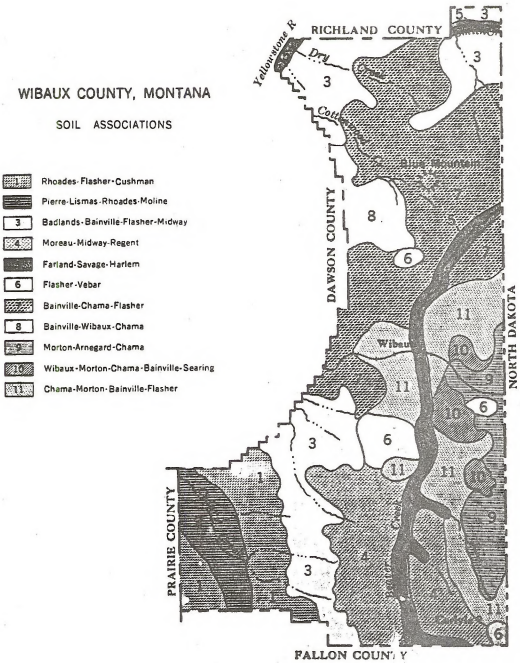
Bainville-Chama-Flasher - These soils, mainly north of Wibaux, are silty loam soils with moderately steep to steep slopes. As most of these soils are unsuitable for tillage, the majority support native range. These soils provide some of the most extensive areas of good grazing in WibauxCounty.

Morton-Arnegard-Chama - These soils, found mainly in the eastern-south-eastern portion of the study area, are dominantly level to gently sloping soils; however, a scoria butte or steep slope is occasionally interspersed in these lands. The soils provide some of the best farm-land in Wibaux County.

Wibaux-Morton-Chama-Bainville-Searing - These soils, chiefly in the central and southern part of the study area, are strongly rough to rough hills. They are characterized by scoria buttes with nearly all these areas in grassland. A few associated with the better agricultural soils are cultivated.

Chama-Morton-Bainville-Flasher - These soils are composed of many kinds of soils and slopes. They are complex silt loam soils and are used for mixed farming-grazing.

SOURCE: Soil Survey of Wibaux County.
U.S. Department of Agriculture.
Series 1943, No. 1. December 1958.



APPENDIX B. Soils of Wibaux County, Montana
SOURCE: Soil Survey of Wibaux County.
U. S. Department of Agriculture.
Series 1943, No. 1, December 1958

Appendix C. Summary of Breeding Bird Survey Results, Savage Route, 1968-1978.

SPECIES	7/5/68	6/11/69	7/7/70	7/1/72	6/28/77	7/7/78
Eared Grebe	-	-	-	-	-	1/1
Blue-winged Teal	-	1/1	-	2/2	13/1	2/2
American Wigeon	-	-	10/1	-	9/1	-
Mallard	-	-	-	2/2	6/1	5/4
Green-winged Teal	-	-	-	-	-	6/1
Golden Eagle	-	-	2/1	1/1	1/1	-
Marsh Hawk	-	2/2	1/1	4/4	1/1	2/2
American Kestrel	2/2	1/1	2/2	1/1	4/4	1/1
Sharp-tailed Grouse	24/2	1/1	10/1	1/1	8/5	-
Ring-necked Pheasant	-	3/2	-	5/5	16/12	9/8
Killdeer	1/1	3/3	4/3	8/7	14/7	8/4
Long-billed Curlew	-	-	-	-	1/1	-
Upland Plover	-	-	4/1	-	3/2	-
Common Snipe	-	-	-	1/1	-	-
Wilson's Phalarope	-	-	-	6/1	-	-
Mourning Dove	53/19	41/22	22/8	18/16	75/30	61/26
Black-billed Cuckoo	-	-	-	-	-	3/3
Short-eared Owl	-	1/1	2/2	-	-	-
Common Nighthawk	12/8	-	-	3/2	1/1	1/1
Common Flicker	3/2	1/1	2/1	1/1	12/8	4/4
Eastern Kingbird	25/17	4/4	15/11	14/10	15/11	13/10
Western Kingbird	8/5	1/1	2/2	4/2	4/2	3/3
Say's Phoebe	2/2	-	-	1/1	3/3	-
Western Wood Pewee	-	-	-	-	1/1	-
Horned Lark	8/5	48/16	33/15	36/21	36/20	38/14
Rough-winged Swallow	-	-	-	-	3/2	9/5
Bank Swallow	-	-	1/1	-	-	-
Barn Swallow	-	4/2	6/4	3/3	3/3	11/7
Cliff Swallow	-	-	6/1	-	11/2	1/1
Black-billed Magpie	-	-	-	-	-	2/2
Common Crow	-	-	-	2/1	7/5	2/2
House Wren	-	-	-	-	-	3/3
Rock Wren	-	-	-	-	1/1	-
Catbird	-	1/1	-	3/3	-	-

	7/5/68	6/11/69	7/7/70	7/1/72	6/28/77	7/7/78
Brown Thrasher	4/4	4/4	2/2	3/2	1/1	3/3
Robin	3/2	4/3	3/3	2/1	6/6	4/4
Mountain Bluebird	-	-	-	-	1/1	-
Loggerhead Shrike	4/2	4/4	11/7	2/2	7/6	2/1
Yellow Warbler	-	-	-	-	1/1	11/7
Yellowthroat	-	-	-	-	1/1	3/3
Yellow-breasted Chat	-	-	-	-	2/2	2/1
Starling	-	3/1	-	-	-	-
W. Meadowlark	153/41	339/48	127/39	75/39	173/49	297/50
Red-winged Blackbird	5/2	10/2	21/9	20/11	27/13	27/13
Northern Oriole	-	-	-	-	-	1/1
Brewer's Blackbird	-	10/5	30/13	-	33/10	1/1
Common Grackle	-	-	-	-	2/1	1/1
Brown-headed Cowbird	13/3	6/3	9/4	17/7	10/8	56/21
Western Tanager	-	-	-	-	-	1/1
Black-headed Grosbeak	-	1/1	-	-	-	-
Lark Bunting	30/16	71/31	16/6	12/6	1/1	-
American Goldfinch	1/1	-	-	-	11/8	8/2
Rufous-sided Towhee	-	-	-	1/1	7/4	2/2
Lazuli Bunting	-	-	-	-	2/2	-
Grasshopper Sparrow	-	-	2/1	4/4	12/10	20/12
Vesper Sparrow	17/13	-	51/22	31/21	38/31	6/4
Lark Sparrow	16/9	21/12	27/19	-	5/3	1/1
Chipping Sparrow	-	-	1/1	-	-	2/1
Field Sparrow	-	-	-	-	17/12	1/1
Brewer's Sparrow	-	-	31/18	-	-	-
Song Sparrow	-	-	11/7	-	-	-
Chestnut-collared Longspur	-	-	-	-	-	2/2
Unidentified Hawk	-	-	-	-	-	1/1
TOTAL SPECIES/INDIVIDUALS	20/384	25/585	30/464	30/283	44/605	45/659

Numbers are: Total number of birds observed/number of stops at which observed

Appendix D. Average Interspersion Coefficient for Each Habitat.

Habitat Type	Interspersion Coefficient
Creek Bottom	58
Grassland-Shrub	19
Small Grain	7
Grass Coulee	17

Appendix E. Amphibians and Reptiles Identified on the Study Area.

Species	Relative Abundance	Status
AMPHIBIANS		
Tiger Salamander *Ambystoma tigrinum*	Common	
Plains Spadefoot Toad *Scaphiopus bombifrons*	Uncommon	Special Interest- North Dakota
Great Plains Toad *Bufo cognatus*	Uncommon	
Rocky Mountain Toad *Bufo woodhousei*	Uncommon	
Northern Chorus Frog *Pseudacris triseriata*	Uncommon	
Leopard Frog *Rana pipiens*	Abundant	
REPTILES		
Snapping Turtle *Chelydra serpentina*	Uncommon-Common	Special Interest- Montana
Painted Turtle *Chrysemys picta*	Common-Abundant	
Short-horned Lizard *Phrynosoma douglassi*	Scarce	Special Interest- North Dakota
Racer *Coluber constrictor*	Uncommon	
Plains Hognose Snake *Heterodon nasicus*	Scarce	Special Interest- Montana
Gopher (Bull) Snake *Pituophis melanoleucus*	Common	
Plains Garter Snake *Thamnophis radix*	Common-Abundant	
Western Rattlesnake *Crotalus viridis*	Common	

Appendix F. Birds Identified on the Study Area.

Species	Status and Abundance	Sighting
Common Loon (E) Gavia immer	M (S)	1 (1)
Horned Grebe Podiceps auritus	M (U)	6 (9)
Eared Grebe Podiceps nigricollis	B (V-C)	37 (553)
Western Grebe Aechmophorus occidentalis	b (C)	12 (21)
Pied-billed Grebe Podilymbus podiceps	b (C)	23 (56)
White Pelican Pelecanus erythrorhynchus	M (S)	1 (2)
Double-crested Cormorant Phalacrocorax auritus	S (U)	9 (26)
Great Blue Heron Ardea herodias	S (C)	11 (12)
Snowy Egret Egretta thula	M (S)	1 (1)
Black-crowned Night Heron Nycticorax nycticorax	M (S)	1 (1)
American Bittern Botaurus lentiginosus	S (U)	3 (3)
Canada Goose Branta canadensis	M (U)	8 (133)
Snow Goose Chen caerulescens	M (S)	1 (6)
Mallard Anas platyrhynchos	B (A)	219 (4111)
Gadwall Anas strepera	b (V-C)	37 (270)

Species	Status and Abundance	Sighting
Pintail Anas acuta	B (A)	102 (2025)
Green-winged Teal Anas crecca	b (V-C)	57 (573)
Blue-winged Teal Anas Discors	B (V-C)	59 (409)
Cinnamon Teal Anas cyanoptera	M (S)	1 (2)
American Wigeon Anas americana	B (V-C)	52 (748)
Northern Shovelor Anas clypeata	B (V-C)	45 (288)
Redhead Aythya americana	b (V-C)	37 (464)
Ring-necked Duck Aythya collaris	M (U)	4 (36)
Canvasback Aythya valisineria	M (C)	15 (85)
Lesser Scaup Aythya affinis	B (V-C)	47 (761)
Common Goldeneye (E) Bucephala clangula	M (C)	16 (116)
Barrow's Goldeneye Bucephala islandica	M (S)	1 (1)
Bufflehead Bucephala albeola	M (C)	17 (88)
Ruddy Duck Oxyura jamaicensis	b (C)	13 (79)
Hooded Merganser Lophodytes cucullatus	M (S)	1 (2)
Common Merganser Mergus merganser	M (U)	9 (38)

Species	Status and Abundance	Sighting
Sharp-shinned Hawk (Y) Accipiter striatus	M (U)	3 (3)
Cooper's Hawk (Y) Accipiter cooperii	M (S)	1 (2)
Red-tailed Hawk Buteo jamaicensis	b (C)	20 (22)
Swainson's Hawk Buteo swainsoni	b (C)	29 (34)
Rough-legged Hawk Buteo lagopus	M (U)	3 (4)
Ferruginous Hawk (Y) Buteo regalis	b (C)	20 (21)
Golden Eagle (X,Y) Aquila chrysaetos	b (U)	7 (9)
Bald Eagle (X,Y,Z) Haliaeetus leucocephalus	W (U)	7 (8)
Marsh Hawk (Y) Circus cyaneus	b (A)	108 (126)
Prairie Falcon (X,Y) Falco mexicanus	b (C)	10 (11)
Merlin (X,Y,Z) Falco columbarius	M (U)	3 (3)
American Kestrel Falco sparverius	b (V-C)	34 (53)
Sharp-tailed Grouse Pedioecetes phasianellus	R (V-C)	64 (346)
Ring-necked Pheasant Phasianus colchicus	R (A)	206 (1079)
Gray Partridge Perdix perdix	R (V-C)	47 (286)
Turkey Meleagris gallopavo	(See Text)	1 (1)

Species	Status and Abundance	Sighting
Whooping Crane (X,Y,E) Grus americana	M (S)	1 (2)
Sandhill Crane (X) Grus canadensis	M (C)[1]	9 (541)
Sora Porzana carolina	S (U)[1]	1 (1)
American Coot Fulica americana	B (A)	60 (1129)
Killdeer Charadrius vociferus	B (A)	184 (480)
American Golden Plover Pluvialis dominica	M (S)	1 (3)
Black-bellied Plover Pluvialis squatarola	M (S)	2 (18)
Common Snipe Capella gallinago	M (U)	6 (54)
Spotted Sandpiper Actitis macularia	S (U)	6 (19)
Solitary Sandpiper Tringa solitaria	M (U)	3 (7)
Willet Catoptrophorus semipalmatus	S (U)	5 (9)
Greater Yellowlegs Tringa melanoleuca	b (C)	20 (88)
Lesser Yellowlegs Tringa flavipes	M (U)	4 (7)
Pectoral Sandpiper Calidris melanotus	M (S)	2 (3)
Least Sandpiper Calidris minutilla	M (U)	5 (47)
Long-billed Dowitcher Limnodromus scolopaceus	M (S)	1 (3)

Species	Status and Abundance	Sighting
Stilt Sandpiper Micropalama himantopus	M (U)	3 (8)
American Avocet Recurvirostra americana	B (U)	8 (29)
Wilson's Phalarope Steganopus tricolor	b (C)	21 (239)
Ring-billed Gull Larus delawarensis	M (C)	11 (32)
Franklin's Gull Larus pipixcan	M (U)	7 (24)
Bonaparte's Gull Larus philadephia	M (U)	1 (2)
Forster's Tern Sterna forsteri	M (U)	3 (3)
Common Tern Sterna hirundo	M (S)	1 (1)
Black Tern Chlidonias niger	M (U)	5 (226)
Rock Dove Columba livia	b (C)	20 (195)
Mourning Dove Zenaidura macroura	B (A)	278 (1358)
Black-billed Cuckoo Coccyzus erythropthalmus	S (U)[a]	2 (2)
Great Horned Owl Bubo virginianus	R (C)	15 (15)
Snowy Owl Nyctea scandiaca	W (S)	1 (1)
Burrowing Owl (Y) Athene cunicularia	b (U)	7 (18)
Short-eared Owl Asio flammeus	b (U)	9 (9)

Species	Status and Abundance	Sighting
Common Nighthawk Chordeiles minor	b (U)	4 (7)
Hummingbird (See Text)	M (S)	1 (1)
Belted Kingfisher Megaceryle alcyon	b (C)	15 (20)
Common Flicker Colaptes auratus	B (V-C)	43 (61)
Red-headed Woodpecker Melanerpes erythrocephalus	S (S)	1 (1)
Hairy Woodpecker Picoides villosus	R (U)	6 (6)
Eastern Kingbird Tyrannus tyrannus	B (V-C)	64 (105)
Western Kingbird Tyrannus verticalis	B (V-C)	54 (86)
Say's Phoebe Sayornis saya	b (C)	29 (35)
Least Flycatcher Empidonax minimus	S (U)	5 (9)
Western Wood Pewee Contopus sordidulus	S (U)	3 (5)
Horned Lark Eremophila alpestris	R (A)	845 (6321)
Tree Swallow Iridoprocne bicolor	S (S)	2 (3)
Bank Swallow Riparia riparia	B (C)[1]	8 (161)
Rough-winged Swallow Stelgidopteryx ruficollis	b (C)	21 (84)
Barn Swallow Hirundo rustica	B (A)	115 (474)

Species	Status and Abundance	Sighting
Solitary Vireo Vireo solitarius	M (S)	2 (3)
Yellow Warbler Dendroica petechia	b (V-C)	54 (123)
Yellow-rumped Warbler (Ø) Dendroica coronata	M (U)	4 (9)
Common Yellowthroat Geothlypis trichas	S (U)	5 (5)
Yellow-breasted Chat Icteria virens	S (S)	1 (1)
American Redstart Setophaga ruticilla	S (S)	2 (2)
House Sparrow Passer domesticus	R (A)	243 (7164)
Bobolink Dolichonyx oryzivorus	b (U)	13 (101)
Western Meadowlark Sturnella neglecta	B (A)	888 (2270)
Yellow-headed Blackbird Xanthocephalus xanthocephalus	B (V-C)	31 (513)
Red-winged Blackbird Agelaius phoeniceus	B (A)	310 (2457)
Orchard Oriole Icterus spurius	S (U)	3 (3)
Northern Oriole Icterus galbula	S (U)	6 (8)
Brewer's Blackbird Euphagus cyanocephalus	S (C)	23 (270)
Common Grackle Quiscalus quiscalus	b (V-C)	45 (149)
Brown-headed Cowbird Molothrus ater	b (V-C)	73 (330)

Species	Status and Abundance	Sighting
Cliff Swallow Petrochelidon pyrrhonota	B (V-C)	39 (561)
Black-billed Magpie Pica pica	R (V-C)	67 (119)
Common Crow Corvus brachyrhychos	M (C)	23 (313)
Black-capped Chickadee Parus atricapillus	R (C)	26 (93)
House Wren Troglodytes aedon	b (C)	12 (25)
Gray Catbird Dumetella carolinensis	b (C)	14 (16)
Brown Thrasher Toxostoma rufum	b (C)	23 (36)
Robin Turdus migratorius	R (A)	304 (989)
Hermit Thrush Catharus guttata	M (S)	3 (3)
Mountain Bluebird Sialia currucoides	S (U)	9 (34)
Water Pipit Anthus spinoletta	M (U)	4 (7)
Bohemian Waxwing Bombycilla garrulus	M (U)	4 (47)
Cedar Waxwing Bombycilla cedrorum	M (S)	2 (30)
Northern Shrike Lanius excubitor	W (C)	12 (12)
Loggerhead Shrike Lanius ludovicianus	B (V-C)	35 (47)
Starling Sturnus vulgaris	R (A)	122 (877)

Species	Status and Abundance	Sighting
Lazuli Bunting Passerina amoena	M (U)	3 (4)
Evening Grosbeak Hesperiphona vespertina	W (U)	4 (46)
Gray-crowned Rosy Finch Leucosticte tephrocotis	W (S)	1 (50)
Common Redpoll Carduelis flammea	W (V-C)	32 (1409)
Pine Siskin Carduelis pinus	M (S)	1 (1)
American Goldfinch Carduelis tristis	S (U)	13 (56)
Rufous-sided Towhee Pipilo erythrophthalmus	b (U)	7 (10)
Lark Bunting Calamospiza melanocorys	b (A)	169 (720)
Savannah Sparrow Passerculus sandwichensis	b (V-C)	55 (169)
Grasshopper Sparrow Ammodramus savannarum	b (C)	18 (18)
Vesper Sparrow Pooecetes gramineus	b (V-C)	46 (114)
Lark Sparrow Chondestes grammacus	b (C)	11 (15)
Dark-eyed Junco Junco nyemalis	M (U)	12 (50)
Tree Sparrow Spizella arborea	W (A)	132 (1019)
Chipping Sparrow Spizella passerina	b (U)	7 (22)
Field Sparrow Spizella pusilla	b (V-C)	34 (130)

Species	Status and Abundance	Sighting
White-crowned Sparrow Zonotrichia leucophrys	M (S)	3 (7)
Song Sparrow Melospiza melodia	b (C)	19 (30)
Lapland Longspur Calcarius lapponicus	M (S)	2 (6)
Chestnut-collared Longspur Calcarius ornatus	b (V-C)	56 (115)
Snow Bunting Plectrophenax nivalis	W (V-C)	38 (2574)

LEGEND:

X - Federal threatened or endangered species
Y - Montana "special interest or concern" species
Z - North Dakota endangered, threatened, or peripheral wildlife species

STATUS:

B - definite breeding species
b - probable breeding species
M - migrant
W - wintering species
S - spring-summer resident

ABUNDANCE:

S - scarce - <3 observations
U - uncommon - 3-10 observations
C - common - 10-30 observations
V-C - very common - 30-75 observations
A - abundant - >75 observations
- deviation made from abundance status listed above

SIGHTING:

Numbers are total number of sightings (total number of individual sighted).

Appendix G. Nesting Birds Identified on the Study Area.

SPECIES	DATES	STATUS (a)
Horned Lark	5/3/78-6/29/78	Adult w/dependent young (2)
W. Meadowlark	5/11/78	Nest w/5 eggs
Robin	5/22/78	Nest w/broken eggs
Mourning Dove	5/23/67-7/20/78	Nest w/eggs and dependent young (8)
Common Flicker	5/23/78	Nest cavity
Bank Swallow	5/23/78-7/7/78	Nest cavities in bank and dependent young (2)
Shovelor	5/23/78-6/29/78	Adult w/dependent young (2)
Pintail	5/23/78-7/24/78	Adult w/dependent young (10)
Killdeer	5/31/78-7/11/78	Adult w/dependent young (4)
Starling	6/1/78	Nest site
Mallard	6/28/78-7/25/78	Adult w/dependent young (18)
Ring-necked Pheasant	6/30/78-8/22/78	Adult w/dependent young (5)
Cliff Swallow	6/30/78	Adult w/dependent young
Blue-winged Teal	7/7/78-7/25/78	Adult w/dependent young (14)
American Wigeon	7/7/78	Adult w/dependent young
Lesser Scaup	7/7/78	Adult w/dependent young
Yellow-headed Blackbird	7/7/78	Adult w/dependent young
Red-winged Blackbird	7/7/78	Adult w/dependent young
Eared Grebe	7/13/78	Adult w/dependent young and nest sites
American Avocet	7/13/78	Adult w/dependent young

SPECIES	DATES	STATUS [a]
American Coot	7/9/78-7/24/78	Adult w/dependent young (11)
Eastern Kingbird	7/19/78-7/25/78	Adult w/dependent young and nest site (2)
Loggerhead Shrike	7/20/78	Adult w/dependent young
Western Kingbird	7/20/78-8/30/78	Adult w/dependent young (2)
Barn Swallow	7/21/78-7/24/78	Adult w/dependent young (2)
Sharp-tailed Grouse	7/21/78-9/19/78	Adult w/dependent young (2)

26 species

(a) Numbers in parentheses are the number of observations during this period and status.

Appendix H. Mammals Identified on the Study Area.

Species	Status & Abundance	Sightings
Masked Shrew Sorex cinerus	N (C)	16 (16) a
Long-legged Myotis (Y) Myotis volans	N (S)	1 (1) b
Whitetail Jackrabbit Lepus townsendi	N (VC)	56 (66) b,c
Mountain Cottontail (Ø) Sylvilagus nuttalli	N (A)	115 (144) b,c See Text
Desert Cottontail Sylvilagus auduboni	N (C)	115 (144) b,c See Text
Thirteen-lined Ground Squirrel Citellus tridecemlineatus	N (VC)	41 (48) a,b
Blacktail Prairie Dogs (Y) Cynomys ludovicianus	N (S) (See Munson, 1979)	4 (4) b
Least Chipmunk Eutamias minimus	N (VC)	31 (35) a,b
Eastern Fox Squirrel Sciurus niger	N (S)	2 (2) a,b
Northern Pocket Gopher Thomomys talpoides	N (VC)	6 (6) a
Wyoming Pocket Mouse Perognathus fasciatus	N (S)	1 (1) b
Beaver Castor canadensis	F (C) (See Munson, 1979)	12 (14) b,c
Western Harvest Mouse Reithrodontomys megalotis	N (S)	2 (2) a
Northern Grasshopper Mouse Onychomys leucogaster	N (S)	2 (2) a
Deer Mouse Peromyscus maniculatus	N (A)	(616) a,b See Text

Species	Status & Abundance	Sightings
White-footed Mouse Peromyscus leucopus	N (S)	(616) a, b See Text
Meadow Vole Microtus pennsylvanicus	N (VC)	(139) a See Text
Prairie Vole Microtus ochrogaster	N (VC)	(139) a, See Text
Sagebrush Vole Lagurus curtatus	N (S)	1 (1) a
Muskrat Ondatra zibethica	F (C)	23 (37) b
House Mouse Mus musculus	N (U) 1	2 (2) a
Meadow Jumping Mouse (Y) Zapus hudsonius	N (U) 1	12 (12) a
Porcupine Erethizon dorsatum	N (C)	23 (24) b, c
Coyote Canis latrans	P (C)	21 (28) b,c
Red Fox Vulpes fulva	UF (C)	24 (27) b,c
Raccoon Procyon lotor	UF (U)	7 (7) b
Longtail Weasel Mustela frenata	P (C)	17 (17) a,b,c
Mink Mustela vison	F (U)	4 (4) b
Badger Taxidea taxus	UF (S)	1 (1) b
Striped Skunk Mephitis mephitis	P (C)	20 (20) b,c
Bobcat Lynx rufus	F (S)	See Text
Least Weasel (Y) Mustela nivalis	P (S)	1 (1) a

Species	Status & Abundance	Sightings
Whitetail Deer Odocoileus virginianus	G (A) See Munson, 1979	120 (673) b
Mule Deer Odocoileus hemionus	G (C) See Munson, 1979	32 (167) b
Pronghorn Antilocapra americana	G (U) See Munson, 1979	9 (96) b

Legend

Y - "Special Interest" Species of Montana
E - Endangered, Threatened, or Peripheral Species of North Dakota

Status:

N - Non-Game Species
UF - Unclassified Predator Species
P - Predator Species
F - Furbearer Species
G - Game Species

Abundance:

(S)- Scarce $<$ 3 observations
(U)- Uncommon 3-10 observations
(C)- Common 10-30 observations
(VC)- Very Common 30-75 observations
(A)- Abundant $>$ 75 observations
1 - Deviation made from above explanation in text

Sightings:

Numbers are total number of sightings
(total number of individuals sighted).

a - Trap data
b - observations
c - additional observations contributed by Munson

APPENDIX TABLE I. Estimates of Fur Harvest by Licensed Trappers for Montana, Region 7, 1973-1978.

Species	1973-1974 (132 trappers)	1974-1975 (128.1 trappers)	1975-1976 (103.8 trappers)	1976-1977 (116.1 trappers)	1977-1978 (---)
Mink	4.1 (209)a	3.5 (145.2)	1.5 (49.3)	2.8 (111.6)	2.7(214)
Muskrat	16.5 (891)	20.0 (1,179.2)	29.1 (1,457.1)	27.7 (1,512.1)	14.5(1,578)
Beaver	11.4 (996)	7.5 (660.2)	17.0 (1,100.0)	19.6 (1,709.9)	12.4(1,609)
Weasel	1.9 (42)	2.5 (42.4)	1.4 (4.1)	1.8 (11.7)	1.4(14)
Bobcat	6.6 (469)	5.0 (283.9)	2.6 (107.2)	3.4 (120.8)	1.3(145)
Skunk	13.9 (1,267)	15.0 (1,227.2)	16.0 (1,179.0)	20.2 (1,576.4)	17.6(2,815)
Coyote	7.9 (437)	11.6 (789.8)	21.3 (1,321.2)	21.1 (1,319.0)	11.7(2,812)
Racoon	10.1 (1,009)	13.3 (1,172.2)	12.4 (877.5)	12.6 (1,015.9)	9.3(1,814)
Badger	3.8 (251)	3.5 (158.9)	4.0 (202.1)	4.8 (280.0)	3.5(475)
Red Fox	16.9 (1,591)	12.3 (1,105.3)	15.3 (1,174.1)	17.2 (1,141.8)	11.1(2,230)
TOTAL PELTS	7,162	6,764	7,472	8,699	13,706

SOURCE: Montana Department of Fish and Game

a Average catch/trapper (calculated total number)

APPENDIX TABLE J. Estimates of Red Fox and Coyote Harvest for North Dakota, 1973-1977.

	Hunters (Harvest)	Trappers (Harvest)	Combined (Harvest)	Ave. Catch	Furbearer Licenses - Golden Valley County
1977-Red Fox	21,833 (30,800)	11,415 (34,300)	33,248 (65,100)	1.96	172
1977-Coyote	11,000 (5,000)	3,140 (3,300)	14,140 (8,300)	0.59	
Total Harvest	---	---	73,400	--	
1976-Red Fox	14,405 (25,350)	6,678 (15,300)	21,083 (40,650)	1.93	97
1976-Coyote	6,300 (1,930)	1,335 (3,500)	7,635 (5,430)	0.71	
Total Harvest	---	---	46,080		
1975-Red Fox	12,307 (14,000)	6,352 (16,600)	18,659 (30,600)	1.64	93
1974-Red Fox	15,150 (38,400)	7,548 (31,700)	22,698 (70,100)	3.09	116
1973-Red Fox	8,530 (18,800)	4,684 (19,800)	13,214 (38,600)	2.92	65

SOURCE: Steve Allen, Furbearer Biologist, North Dakota Fish and Game Department

APPENDIX TABLE K. Comparison of Small Mammal Densities in 10 Vegetative Types

Species	Small Grain Fields	Upland Grass-land	Creek Bottom	Grass-land Coulee	Reser-voir - Creek	Wildlife Shelter Belt	Xeric Shrub	Badland Bluffs	Hardwood Draw	Mesic Shrub
Trapnights	1,150	900	900	900	1,000	900	900	900	1,200	900
Peromyscus spp.[a]	45	42	70	12	33	26	52	66	121	142
Microtus spp.[a]	33	6	5	20	34	5	1	1	2	29
Least Chipmunk	-	5	2	-	-	5	-	6	5	-
Masked Shrew	6	-	-	2	3	1	-	-	-	2
13 Lined Ground Squirrel	1	-	-	3	-	-	3	2	-	-
Meadow Jumping Mice	-	-	3	1	4	1	-	-	1	2
Grasshopper Mice	2	-	-	-	-	-	-	-	-	-
House Mice	1	-	-	-	-	-	-	-	-	-
W. Harvest Mice	-	-	-	-	1	1	-	-	-	-
Pocket Gopher	-	-	-	1	-	-	-	-	-	-
Sagebrush Vole	-	-	-	-	-	-	-	1	-	-
Longtailed Weasel	-	1	-	-	-	-	-	-	-	-
Other Species	-	2	-	-	10	5	-	-	2	3
TRAP EFFICIENCY	7.65[b]	6.22	8.89	4.33	8.50	4.89	6.22	8.44	10.92	19.77

a Two species - see species account in text for explanation.
b Number of animals per 100 trapnights

s Card

a wildlife baseline
ame species.

r	Division	Date Ret'd
AAI-3161 y (Fuller)	1/2 D/App	2 1987

DSC 1279-3a (Feb. 1977)

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